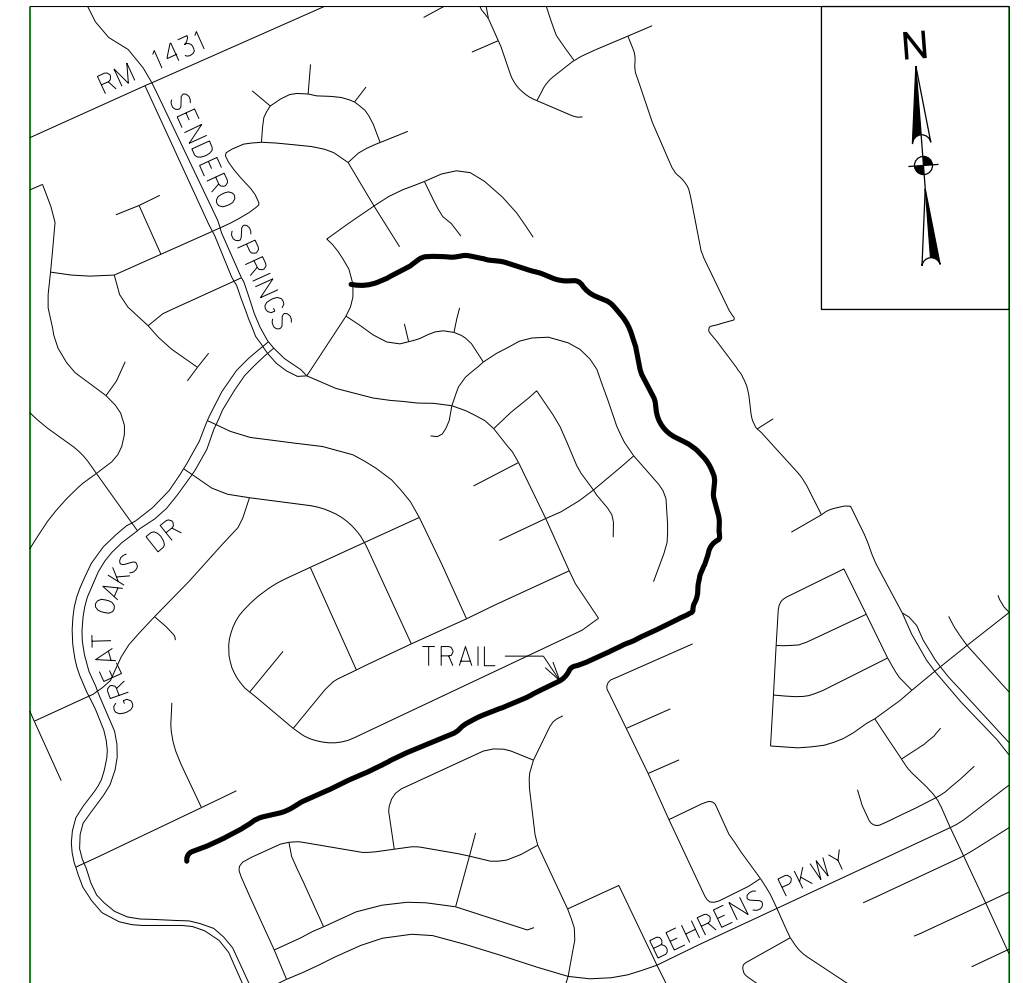


Brushy Creek Municipal Utility District

SENDERO SPRINGS TRAIL AND DRAINAGE IMPROVEMENTS



Location Map



PRESIDENT
REBECCA B. TULLOS

VICE PRESIDENT
RUSS SHERMER

SECRETARY
KIM FILIATRAULT

**ASSISTANT SECRETARY/
TREASURER**
DONNA B. PARKER

TREASURER
SHEAN R. DALTON

SHEET LIST

- 1 COVER SHEET
- 2 GENERAL NOTES
- 3 PROJECT LAYOUT
- 4-7 HORIZONTAL ALIGNMENT DATA
- 8-12 DRAINAGE AREA MAP
- 13 HYDRAULIC CALCULATIONS
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- 19-29 EROSION CONTROL PLAN SHEETS
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- 34-46 TRAIL IMPROVEMENT PLAN SHEETS
- 47 GRADING DETAILS
- 48 DRAINAGE PROFILES
- 49-53 STORM DRAINAGE DETAIL SHEETS

APPROVED FOR CONSTRUCTION:

BRUSHY CREEK MUNICIPAL UTILITY DISTRICT

HALFF
TBPE FIRM #F-312
 TWO SIERRA WAY, SUITE 105
 GEORGETOWN, TEXAS 78626-7574
 TEL (512) 942-6232
 FAX (512) 869-0089

JULY 2016
AVO 31377



100% PLANS

GENERAL NOTES:

1. All construction shall be in accordance with Williamson County standards, BCMUD standards, State Law & Regulations.
2. Any existing utilities, pavement, curbs, sidewalks, structures, trees, trail markers, etc., not planned for destruction or removal that are damaged or removed shall be repaired or replaced at contractor's expense.
3. The Contractor shall verify all depths and locations of existing utilities prior to any construction. Any discrepancies with the construction plans found in the field shall be brought immediately to the attention of the Engineer who shall be responsible for revising the plans as appropriate.
4. The Contractor shall give the BCMUD 48 hours notice before beginning each phase of construction.
5. All areas disturbed or exposed during construction shall be revegetated in accordance with the plans and specifications. Revegetation of all disturbed or exposed areas shall consist of sodding or seeding, at the Contractor's option unless otherwise called out in plans. However, the type of revegetation must equal or exceed the type of vegetation present before construction.
6. The Contractor and the Engineer shall keep accurate records of all construction that deviates from the plans. The Engineer shall furnish BCMUD accurate "As-Built" drawings following completion of all construction. These "As-Built" drawings shall meet with the satisfaction of the Engineering and Development Services Department prior to final acceptance.
7. The Brushy Creek MUD shall not be petitioned for acceptance until all necessary easement documents have been signed and recorded.
8. When construction is being carried out within easements, the Contractor shall confine his work to within the permanent and any temporary easements. Prior to final acceptance, the Contractor shall be responsible for removing all trash and debris within the permanent and temporary easements. Clean-up shall be to the satisfaction of the Engineer.
9. Prior to any construction, the Contractor shall apply for and secure all proper permits from the appropriate authorities.
10. Available benchmarks that may be utilized for the construction of this project are described as follows:

SURVEY CONTROL TABLE

POINT NUMBER	NORTHING	EASTING	TYPE	ELEVATION
1147	10168783.70	3113304.40	SET NAIL "TP"	849.05
1148	10168944.36	3113278.50	SET NAIL "TP"	851.43
1231	10169158.21	3113741.97	SET NAIL "TP"	828.08
1232	10169087.58	3113904.74	SET NAIL "TP"	825.29
1604	10169480.80	3114780.02	SET NAIL "TP"	825.84
1605	10169562.59	3114911.68	SET NAIL "TP"	829.63
1700	10169635.59	3115161.21	SET NAIL "TP"	825.72
2552	10169612.28	3115555.07	SET NAIL "TP"	816.34
1832	10169804.82	3115495.30	SET NAIL "TP"	818.34
2673	10170215.48	3116335.74	SET NAIL "TP"	798.57
2674	10170374.57	3116273.46	SET NAIL "TP"	801.76
2986	10171453.72	3115994.84	SET NAIL "TP"	807.69
2985	10171644.62	3115972.09	SET NAIL "TP"	808.10
3773	10172153.98	3114860.06	SET NAIL "TP"	839.02
3772	10172049.87	3114658.53	SET NAIL "TP"	850.48

NOTE:
SURVEY COORDINATES ARE STATE PLANE, NAD 83 TEXAS
COORDINATE SYSTEM CENTRAL ZONE. USE AN ADJUSTMENT FACTOR OF
1.00012 TO CONVERT TO SURFACE COORDINATES.

11. Preparing Right-Of-Way shall be performed adjacent to trail improvements for the approximate station ranges listed below:

Trail CL	STA 3+15 to 7+60	NC-1	STA 1+60 to 3+25
Trail CL	STA 15+30 to 18+45	NC-2	STA 1+05 to 2+80
Trail CL	STA 22+25 to 24+40	NC-3	STA 1+60 to 2+00
Trail CL	STA 25+95 to 29+60		
Trail CL	STA 33+10 to 36+25		
Trail CL	STA 44+60 to 44+90		
Trail CL	STA 46+30 to 48+50		
Trail CL	STA 49+15 to 51+30		
Trail CL	STA 59+50 to 59+65		
Trail CL	STA 61+05 to 62+00		

TRENCH SAFETY NOTES:

1. In accordance with the Laws of the State of Texas and the U. S. Occupational Safety and Health Administration regulations, all trenches over 5 feet in depth in either hard and compact or soft and unstable soil shall be sloped, shored, sheeted, braced or otherwise supported. Furthermore, all trenches less than 5 feet in depth shall also be effectively protected when hazardous ground movement may be expected. Trench safety systems to be utilized for this project will be provided by the Contractor.
2. In accordance with the U. S. Occupational Safety and Health Administration regulations, when persons are in trenches 4 feet deep or more, adequate means of exit, such as a ladder or steps, must be provided and located so as to require no more than 25 feet of lateral travel.
3. If trench safety system details were not provided in the plans because trenches were anticipated to be less than 5 feet in depth and during construction it is found that trenches are in fact 5 feet or more in depth or trenches less than 5 feet in depth are in an area where hazardous ground movement is expected, all construction shall cease, the trenched area shall be barricaded and the Engineer notified immediately. Construction shall not resume until appropriate trench safety system details, as designed by a professional engineer, are retained and copies submitted to the Engineer.

STREET AND DRAINAGE NOTES:

1. All testing shall be done by an independent laboratory at the Owner's expense. Any retesting shall be paid for by the Contractor. Testing shall be coordinated with the Inspector and he shall be given a minimum of 24 hours notice prior to any testing.
2. Backfill behind the curb shall be compacted to obtain a minimum of 95% maximum density to within 3" of top of curb. Material used shall be primarily granular with no rocks larger than 6" in the greatest dimension. The remaining 3" shall be clean topsoil free from all clods and suitable for sustaining plant life.
3. All R.C.P. shall be minimum class III. All PVC shall be SDR-26.

TRAFFIC MARKING NOTES:

1. Any methods, street markings and signage necessary for warning motorists, warning pedestrians or diverting traffic during construction shall conform to the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest edition.
2. All pavement markings, markers, paint, traffic buttons, traffic controls and signs shall be installed in accordance with the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges and, the Texas Manual of Uniform Traffic Control Devices for Streets and Highways, latest editions.

EROSION AND SEDIMENTATION CONTROL NOTES:

1. Erosion control measures, site work and restoration work shall be in accordance with the details.
2. All slopes shall be sodded or seeded with approved grass, grass mixtures or ground cover suitable to the area and season in which they are applied.
3. Silt fences, rock berms, sedimentation basins and similarly recognized techniques and materials shall be employed during construction to prevent point source sedimentation loading of downstream facilities. Additional measures may be required if, in the opinion of the Engineer, they are warranted.
4. All temporary erosion control measures shall not be removed until final inspection and approval of the project by the Engineer. It shall be the responsibility of the Contractor to maintain all temporary erosion control structures and to remove each structure as approved by the Engineer.
5. All mud, dirt, rocks, debris, etc., spilled, tracked or otherwise deposited on existing paved streets, drives and areas used by the public shall be cleaned up immediately.
6. Restore all disturbed areas, including construction entrances and staging areas, to equal or exceed the original site condition.

SPECIAL NOTES:

1. Contractor shall perform work described in these plans so as to minimize construction vehicle traffic on finished improvements and repaired sections of the trail.
2. Any damaged areas of the trail outside designated areas of improvement will be returned to satisfactory condition, as determined by BCMUD staff. When the Contractor feels that they have completed work on a section of trail such that the section of trail will no longer see traffic from construction vehicles, the Contractor will schedule a walk-through of that section of trail with BCMUD staff to determine areas to be repaired. The labor and materials required shall be paid for by the line item bid for "GRANITE GRAVEL HIKE & BIKE TRAIL (POST CONSTRUCTION TRAIL REPAIR, 2)" and the final quantity will be calculated and agreed upon by both the Contractor and Owner.
3. Where construction vehicles must drive or operate over the critical root zones of trees, plywood shall be laid in vehicle path in addition to mulch required by details. Cost of plywood will be subsidiary to tree protection measures.
4. Erosion control log shall be subsidiary to the line item payment for silt fence.
5. Contractor to verify and designate boundaries of private property prior to construction. No work shall be performed on private property without easements. Contractor shall immediately notify the engineer of any conflict between property lines and proposed work.

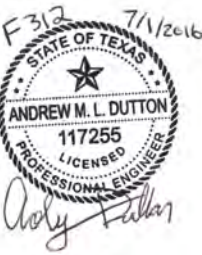
SEQUENCE OF CONSTRUCTION:

1. Install all tree protection fence, silt fence, rock berms, construction entrances, construction fence, and spoils areas in accordance with the erosion control plans.
2. Establish trail and neighborhood connection centerlines.
3. Construct proposed trail improvements.
4. Establish hydromulch seeding for all disturbed areas.
5. Repair trails as stated in Special Note 1 above.
6. Remove all temporary erosion control devices.

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
BRUSHY CREEK MUD
16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



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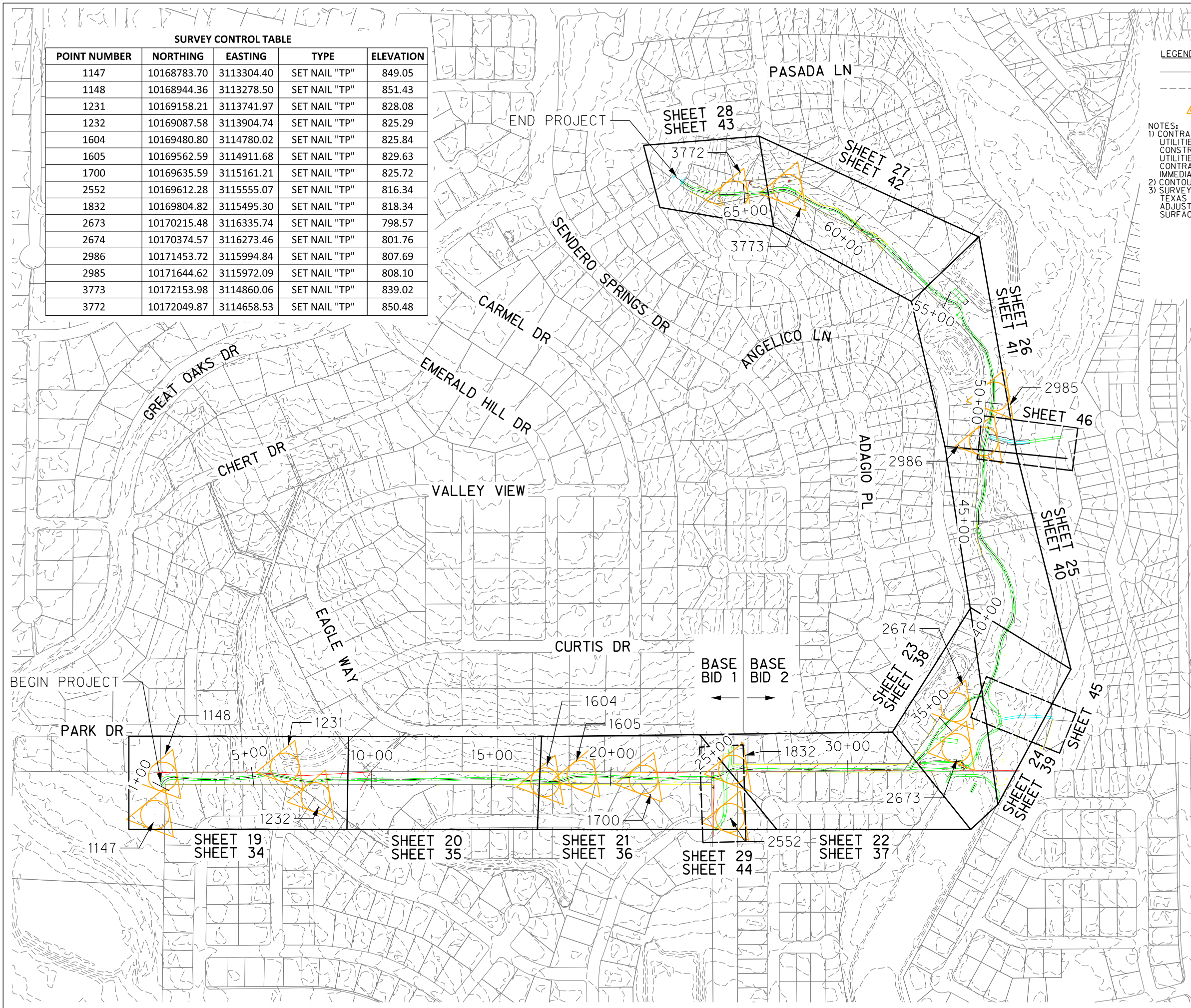


Project No: AV0 #31377
 Issued: _____
 Revisions:

No.	Date	Description

 Drawn by: JN
 Checked by: AD
 Sheet Title:
GENERAL NOTES
 Sheet Number:
2

SURVEY CONTROL TABLE				
POINT NUMBER	NORTHING	EASTING	TYPE	ELEVATION
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1700	10169635.59	3115161.21	SET NAIL "TP"	825.72
2552	10169612.28	3115555.07	SET NAIL "TP"	816.34
1832	10169804.82	3115495.30	SET NAIL "TP"	818.34
2673	10170215.48	3116335.74	SET NAIL "TP"	798.57
2674	10170374.57	3116273.46	SET NAIL "TP"	801.76
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3772	10172049.87	3114658.53	SET NAIL "TP"	850.48



LEGEND

——— PROPERTY LINE

--- EXISTING COUNTOUR (2')

▲ SURVEY CONTROL POINT

NOTES:

1) CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES VERTICALLY AND HORIZONTALLY PRIOR TO CONSTRUCTION. IF CONFLICTS ARE ENCOUNTERED OR UTILITIES ARE DIFFERENT THAN WHAT IS SHOWN, CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY.

2) CONTOURS BASED ON LIDAR DATED 2012.

3) SURVEY COORDINATES ARE STATE PLANE, NAD 83 TEXAS COORDINATE SYSTEM CENTRAL ZONE. USE AN ADJUSTMENT FACTOR OF 1.00012 TO CONVERT TO SURFACE COORDINATES.

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS

BRUSHY CREEK MUD
16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



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TWO SIERRA WAY, SUITE 105
GEORGETOWN, TEXAS 78626-7574
TEL (512) 942-6232
FAX (512) 868-0089



F312 7/1/2016

STATE OF TEXAS
ANDREW M. L. DUTTON
117255
LICENSED PROFESSIONAL ENGINEER

Andrew M. L. Dutton

Project No: AV0 #31377

Issued: _____

Revisions:

No.	Date	Description

Drawn by: JN
Checked by: AD
Sheet Title: PROJECT LAYOUT

Sheet Number: 3

TRAIL CENTERLINE (CONT.)

Curve TRAILCL-25
Curve Data
P.I. Station 38+24.41 N 10,170,577.9020 E 3,116,378.6107
Delta = 15° 42' 08.16" (LT)
Degree = 29° 55' 54.17"

Course from PT TRAILCL-25 to PC TRAILCL-26 N 11° 30' 47.08" W Dist 84.4351

Curve TRAILCL-26
Curve Data
P.I. Station 39+53.52 N 10,170,704.7432 E 3,116,352.7745
Delta = 22° 32' 45.40" (RT)
Degree = 61° 21' 07.38"

Course from PT TRAILCL-26 to PC TRAILCL-27 N 11° 01' 58.33" E Dist 46.8499

Curve TRAILCL-27
Curve Data
P.I. Station 40+55.28 N 10,170,805.0901 E 3,116,372.3397
Delta = 31° 07' 31.07" (LT)
Degree = 43° 23' 42.12"

Curve TRAILCL-28
Curve Data
P.I. Station 42+16.59 N 10,170,958.2902 E 3,116,316.2993
Delta = 40° 06' 08.31" (LT)
Degree = 16° 32' 59.68"

Course from PT TRAILCL-28 to PC TRAILCL-29 N 60° 11' 41.05" W Dist 59.1854

Curve TRAILCL-29
Curve Data
P.I. Station 44+40.34 N 10,171,074.6765 E 3,116,113.1206
Delta = 39° 30' 40.00" (RT)
Degree = 42° 19' 53.82"

Course from PT TRAILCL-29 to PC TRAILCL-30 N 20° 41' 01.05" W Dist 45.8880

Curve TRAILCL-30
Curve Data
P.I. Station 45+53.34 N 10,171,184.0236 E 3,116,071.8375
Delta = 24° 24' 21.73" (RT)
Degree = 55° 21' 38.50"

Curve TRAILCL-31
Curve Data
P.I. Station 46+16.15 N 10,171,247.3828 E 3,116,075.9597
Delta = 26° 22' 47.40" (LT)
Degree = 32° 39' 46.01"

Course from PT TRAILCL-31 to PC TRAILCL-32 N 22° 39' 26.73" W Dist 124.6744

Curve TRAILCL-32
Curve Data
P.I. Station 48+00.52 N 10,171,418.8698 E 3,116,004.3748
Delta = 16° 09' 09.27" (RT)
Degree = 40° 33' 48.80"

Course from PT TRAILCL-32 to PC TRAILCL-33 N 6° 30' 17.46" W Dist 92.9336

Curve TRAILCL-33
Curve Data
P.I. Station 49+86.57 N 10,171,603.9858 E 3,115,983.2676
Delta = 14° 27' 35.64" (LT)
Degree = 9° 54' 39.48"

Curve TRAILCL-34
Curve Data
P.I. Station 51+07.10 N 10,171,717.2596 E 3,115,939.8658
Delta = 15° 44' 58.86" (LT)
Degree = 16° 31' 18.91"

Course from PT TRAILCL-34 to PC TRAILCL-35 N 36° 42' 51.95" W Dist 56.0373

Curve TRAILCL-35
Curve Data
P.I. Station 52+35.51 N 10,171,820.6865 E 3,115,862.7332
Delta = 30° 20' 23.19" (LT)
Degree = 62° 05' 29.73"

Curve TRAILCL-36
Curve Data
P.I. Station 53+02.61 N 10,171,847.3014 E 3,115,799.8672
Delta = 12° 13' 13.21" (RT)
Degree = 14° 10' 54.07"

Curve TRAILCL-37
Curve Data
P.I. Station 53+81.43 N 10,171,892.8917 E 3,115,735.1576
Delta = 26° 40' 08.95" (RT)
Degree = 37° 49' 14.93"

Course from PT TRAILCL-37 to PC TRAILCL-38 N 28° 09' 52.99" W Dist 113.8862

Curve TRAILCL-38
Curve Data
P.I. Station 54+48.81 N 10,171,953.4408 E 3,115,702.7394
Delta = 62° 37' 08.15" (LT)
Degree = 106° 20' 03.18"

Curve TRAILCL-39
Curve Data
P.I. Station 55+36.32 N 10,171,952.1530 E 3,115,608.5879
Delta = 26° 36' 23.82" (RT)
Degree = 22° 04' 09.34"

Curve TRAILCL-40
Curve Data
P.I. Station 56+70.42 N 10,172,011.5299 E 3,115,485.8862
Delta = 5° 12' 04.84" (LT)
Degree = 3° 28' 24.08"

Curve TRAILCL-41
Curve Data
P.I. Station 58+25.15 N 10,172,066.0615 E 3,115,340.9735
Delta = 0° 53' 26.62" (LT)
Degree = 0° 33' 26.51"

Curve TRAILCL-42
Curve Data
P.I. Station 59+21.17 N 10,172,098.4795 E 3,115,250.5870
Delta = 19° 17' 15.27" (LT)
Degree = 60° 24' 25.76"

Curve TRAILCL-43
Curve Data
P.I. Station 59+60.10 N 10,172,098.7831 E 3,115,211.3516
Delta = 24° 29' 05.54" (RT)
Degree = 53° 46' 25.89"

Curve TRAILCL-44
Curve Data
P.I. Station 59+96.92 N 10,172,114.5981 E 3,115,177.3251
Delta = 9° 21' 52.05" (LT)
Degree = 32° 34' 54.28"

Course from PT TRAILCL-44 to PC TRAILCL-45 N 74° 26' 10.55" W Dist 55.1773

Curve TRAILCL-45
Curve Data
P.I. Station 61+00.91 N 10,172,142.5169 E 3,115,077.0861
Delta = 26° 23' 55.74" (LT)
Degree = 38° 58' 47.04"

Curve TRAILCL-46
Curve Data
P.I. Station 61+56.52 N 10,172,131.8326 E 3,115,021.2628
Delta = 17° 54' 36.23" (RT)
Degree = 40° 22' 28.38"

Curve TRAILCL-47
Curve Data
P.I. Station 63+37.04 N 10,172,154.1120 E 3,114,841.7542
Delta = 47° 16' 05.09" (LT)
Degree = 55° 17' 53.52"

Curve TRAILCL-48
Curve Data
P.I. Station 63+95.00 N 10,172,113.3507 E 3,114,793.5079
Delta = 16° 11' 20.77" (RT)
Degree = 45° 43' 47.45"

Curve TRAILCL-49
Curve Data
P.I. Station 66+31.29 N 10,172,017.1317 E 3,114,577.4369
Delta = 23° 19' 37.55" (RT)
Degree = 13° 49' 48.84"

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS BRUSHY CREEK MUD 16318 GREAT OAKS DR. ROUND ROCK, TX 78681



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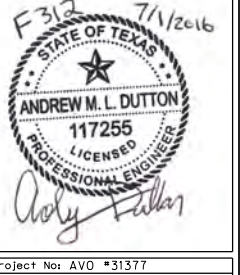
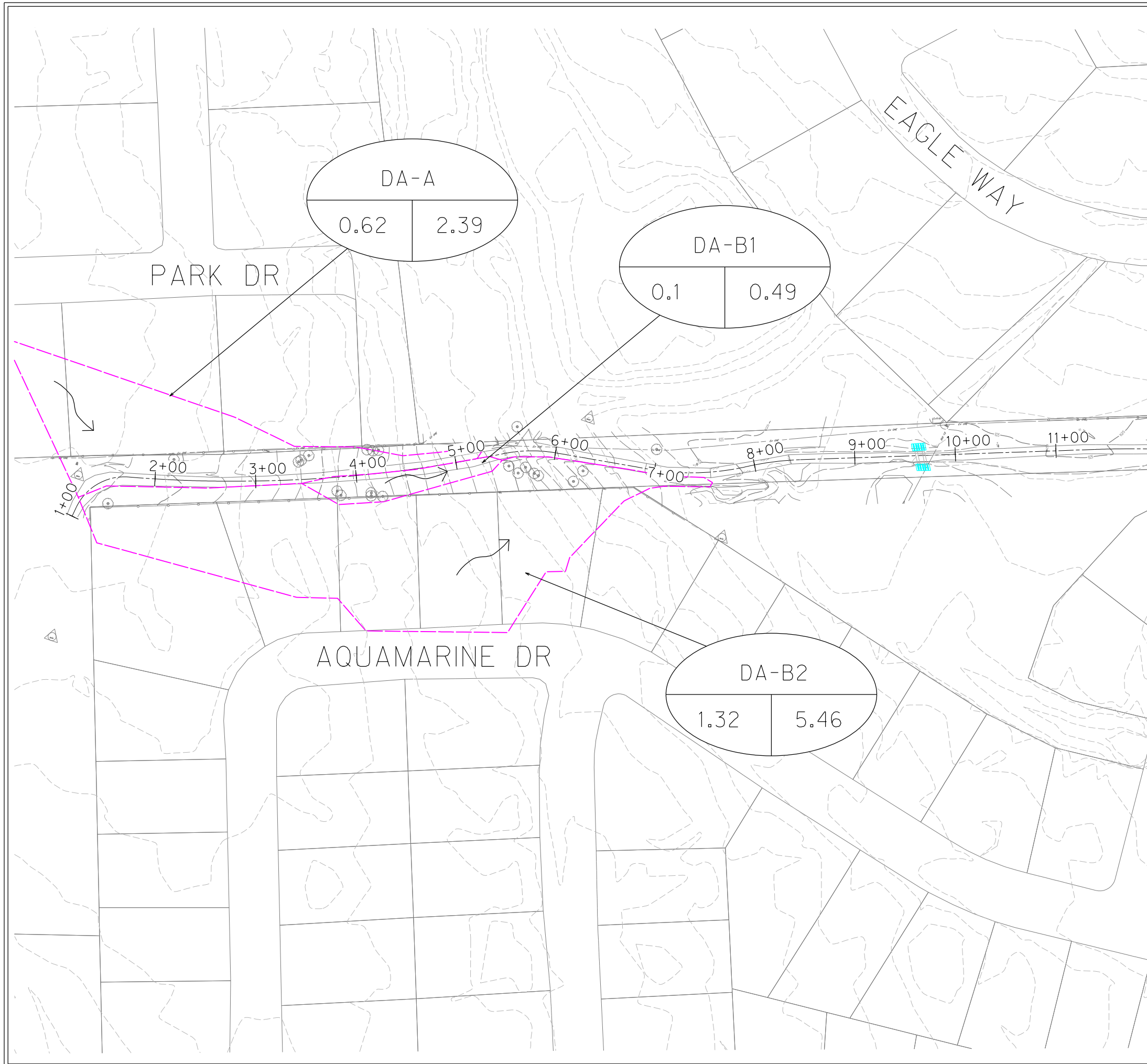
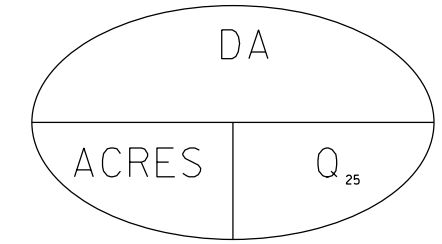


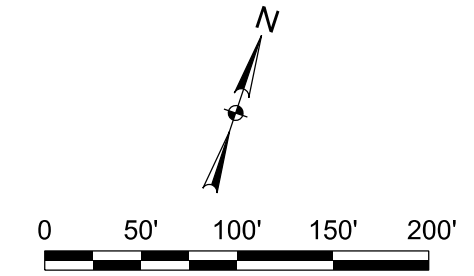
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- LEGEND**
- EXISTING PROPERTY LINE
 - DRAINAGE AREA
 - ← FLOW ARROW



- GENERAL NOTES:**
- 1) LIDAR FLOWN IN 2012.
 - 2) HYDRAULIC CALCULATIONS WERE PERFORMED USING RATIONAL METHOD USING CITY OF ROUND ROCK CRITERIA.



MATCHLINE SHEET 8

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
BRUSHY CREEK MUD
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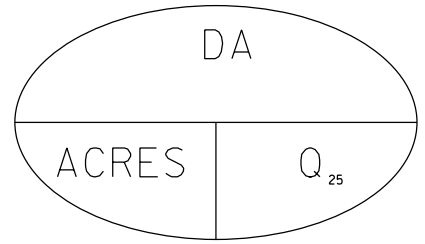
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No.	Date	Description

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Checked by: AD
Sheet Title:
DRAINAGE AREA MAP

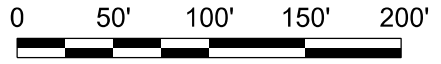
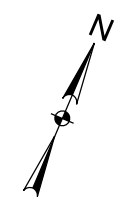
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MATCHLINE SHEET 7

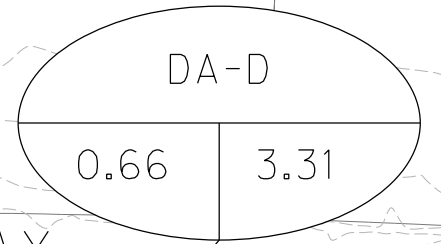
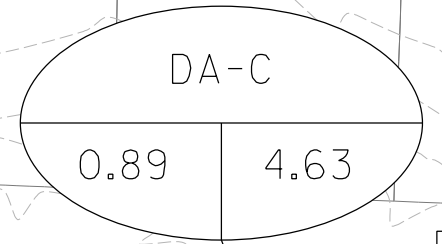
- LEGEND**
- EXISTING PROPERTY LINE
 - DRAINAGE AREA
 - FLOW ARROW



- GENERAL NOTES:**
- LIDAR FLOWN IN 2012.
 - HYDRAULIC CALCULATIONS WERE PERFORMED USING RATIONAL METHOD USING CITY OF ROUND ROCK CRITERIA.



MATCHLINE SHEET 9



EAGLE WAY

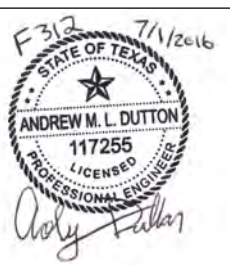
TOURMALINE TRL

WALSH RANCH

**SENDERO SPRINGS
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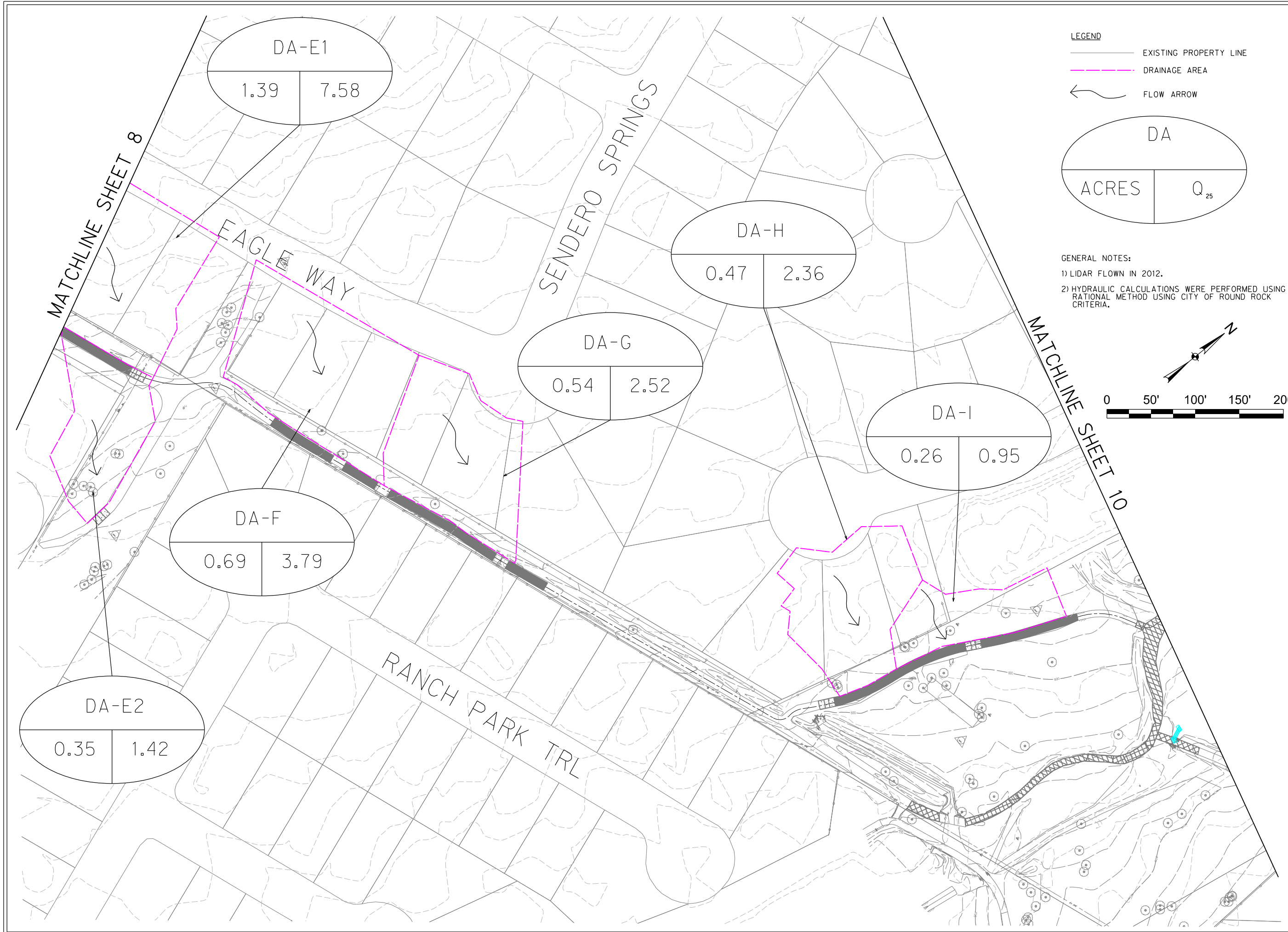


Project No: AV0 #31377
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DRAINAGE AREA MAP

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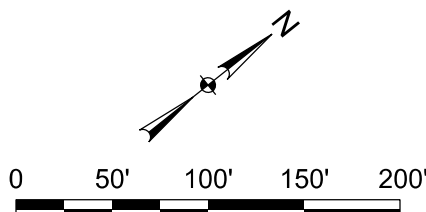
LEGEND

- EXISTING PROPERTY LINE
- DRAINAGE AREA
- FLOW ARROW

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ACRES	Q ₂₅

GENERAL NOTES:

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- HYDRAULIC CALCULATIONS WERE PERFORMED USING RATIONAL METHOD USING CITY OF ROUND ROCK CRITERIA.



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
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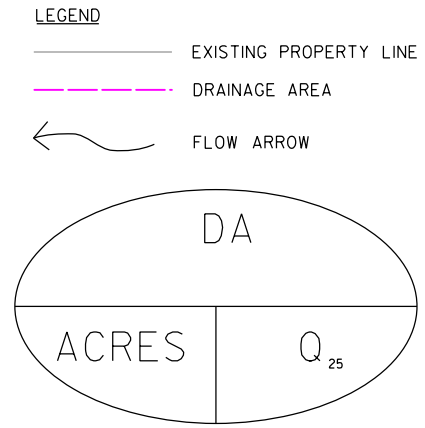
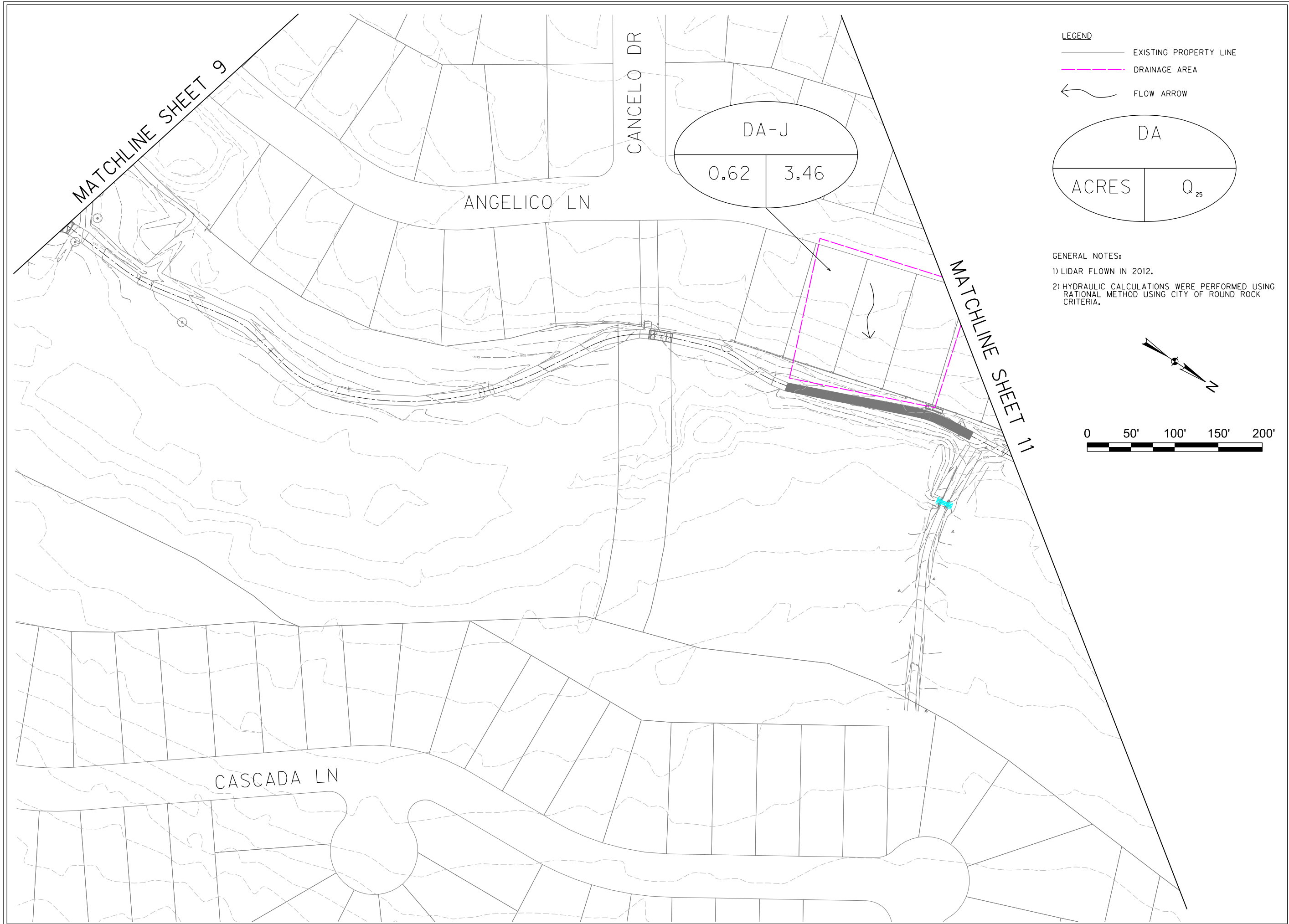


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 STATE OF TEXAS
 ANDREW M. L. DUTTON
 117255
 LICENSED PROFESSIONAL ENGINEER
Andy Dutton

Project No: AVO #31377
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Revisions:		
No.	Date	Description

Drawn by: JN
 Checked by: AD
 Sheet Title: **DRAINAGE AREA MAP**
 Sheet Number: **9**



GENERAL NOTES:

- LIDAR FLOWN IN 2012.
- HYDRAULIC CALCULATIONS WERE PERFORMED USING RATIONAL METHOD USING CITY OF ROUND ROCK CRITERIA.

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR.
 ROUND ROCK, TX 78681



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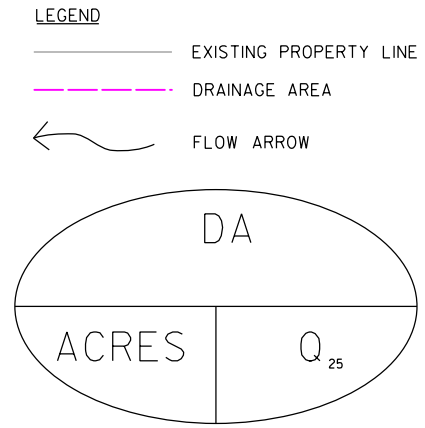
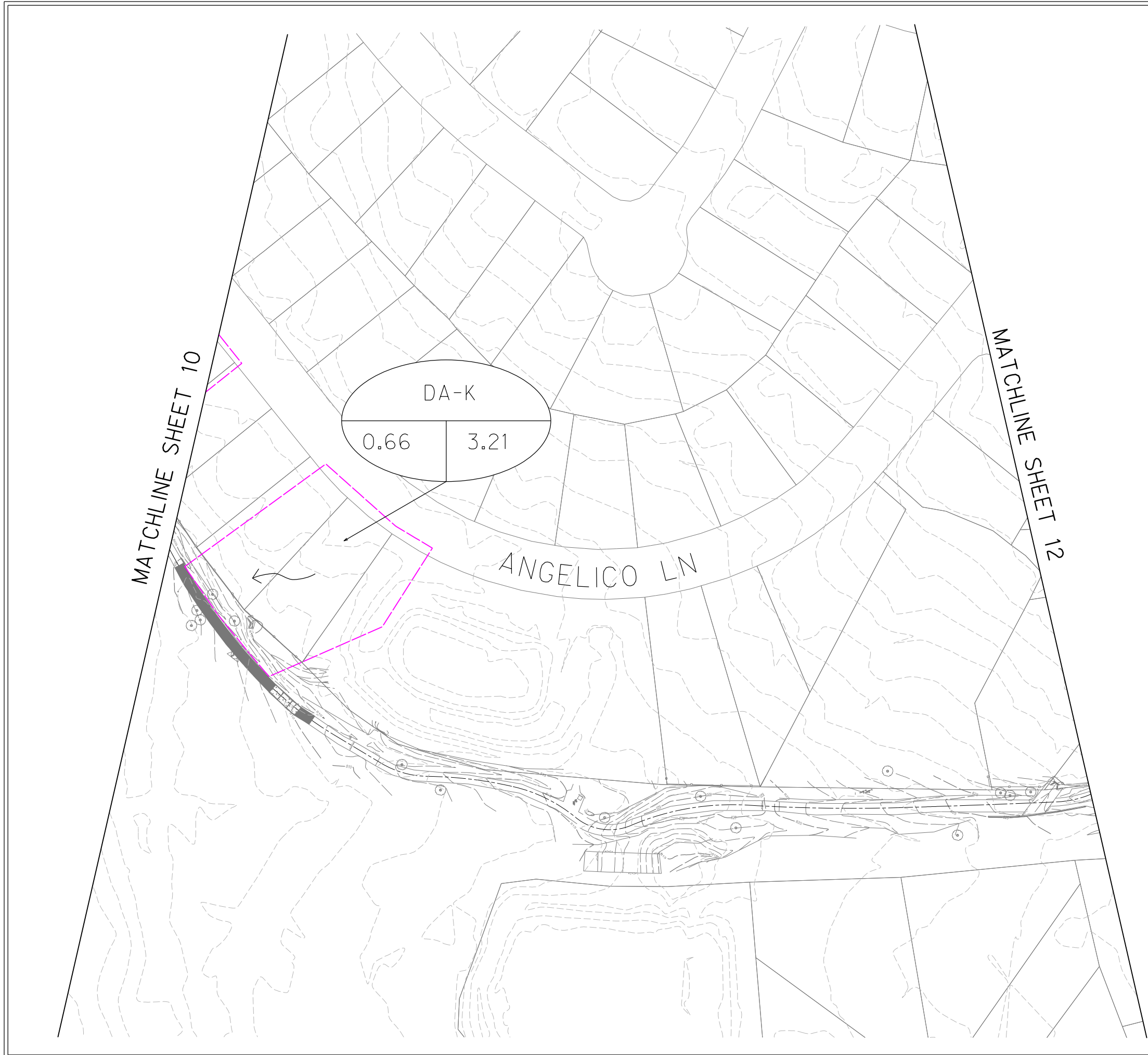


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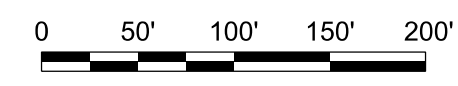
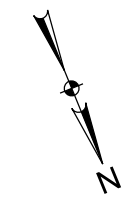
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No.	Date	Description

Drawn by: JN
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 Sheet Title:
DRAINAGE AREA MAP

Sheet Number
10



- GENERAL NOTES:**
- 1) LIDAR FLOWN IN 2012.
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**SENDERO SPRINGS
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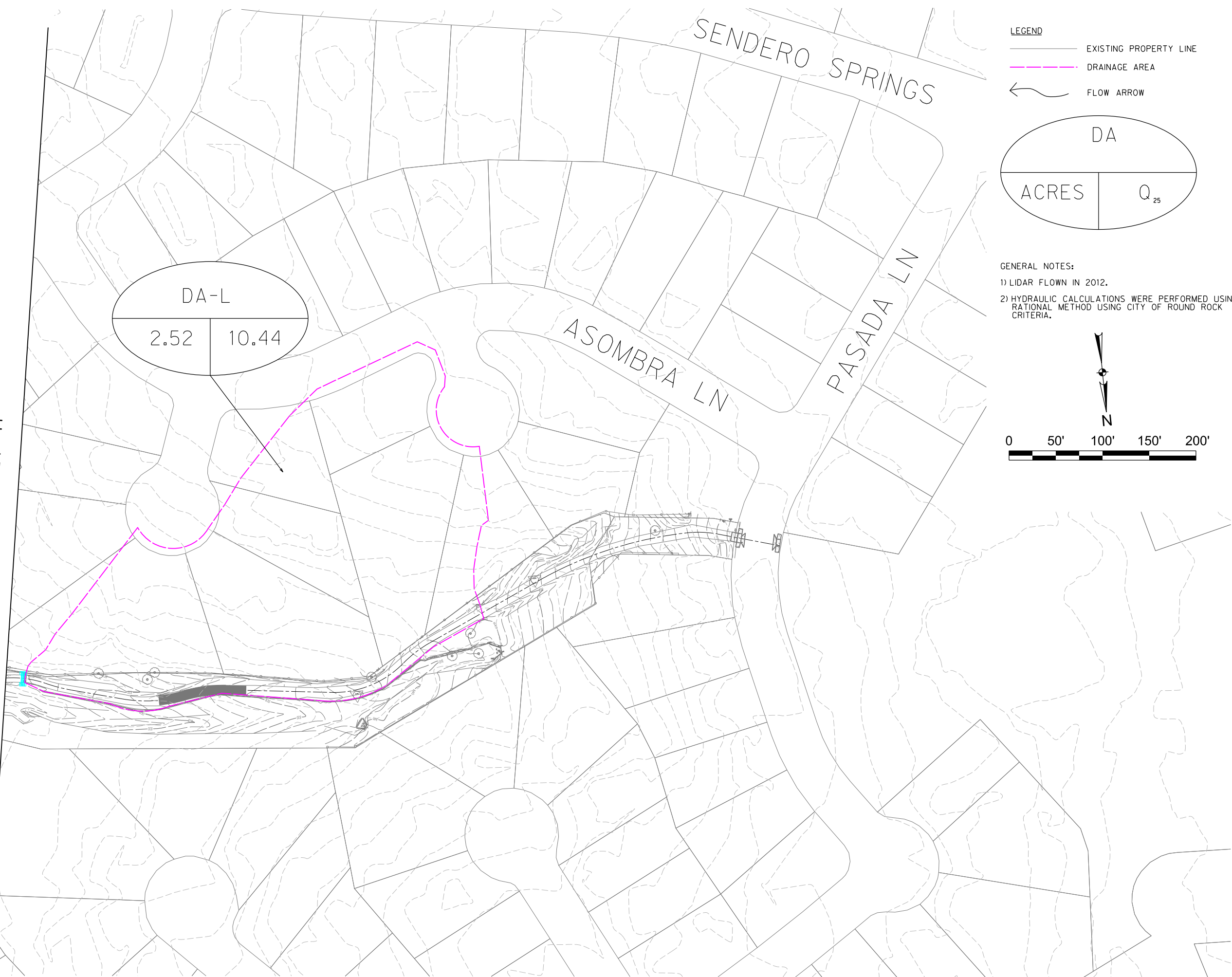


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Sheet Title:
DRAINAGE AREA MAP

MATCHLINE SHEET 11



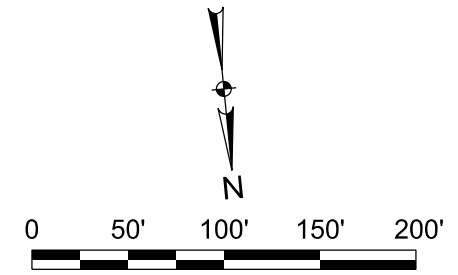
DA-L	
2.52	10.44

LEGEND

- EXISTING PROPERTY LINE
- DRAINAGE AREA
- FLOW ARROW

DA	
ACRES	Q ₂₅

- GENERAL NOTES:**
- LIDAR FLOWN IN 2012.
 - HYDRAULIC CALCULATIONS WERE PERFORMED USING RATIONAL METHOD USING CITY OF ROUND ROCK CRITERIA.



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
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 Sheet Title
DRAINAGE AREA MAP
 Sheet Number
 12

Sendero Springs Trail Improvements - Area Hydraulic Calculations

Area #	Area total (ac)	Overland Flow				Shallow Concentrated Flow				Channel Flow			Tc	Tc (Used)	Intensity i - (in/hr)	C (runoff Coeff)	Q ₂₅ (Drng Area Flow) (cfs)
		Length (Ft) (Sheet flow)	Slope (Ft/Ft)	Corrected Slope	Tt (Sheet flow) (mins)	Length (Ft) (Shall/Concen)	Slope (Ft/Ft)	Corrected Slope	Tt (Shall/Concen) (mins)	Length (Ft) (Channel)	Velocity V - (Ft/s)	Tt(Channel) (mins)					
A	0.62	100	0.01	0.010	12.47	20	0.03	0.030	0.12	375	4.00	1.56	14.15	14.15	7.13	0.54	2.39
B1	0.095	76	0.0658	0.066	4.71	0	0.00	0.005	0.00	92	4.00	0.38	5.10	5.10	10.07	0.51	0.49
B2	1.32	100	0.015	0.015	10.60	377	0.05	0.048	1.78	150	4.00	0.63	13.01	13.01	7.39	0.56	5.46
B1+B2	1.42	100	0.015	0.015	10.60	377	0.05	0.048	1.78	150	4.00	0.63	13.01	13.01	7.39	0.55	5.82
C	0.89	100	0.07	0.070	5.73	74	0.07	0.068	0.29	0	N/A	0.00	6.02	6.02	9.64	0.54	4.63
D	0.66	100	0.06	0.060	6.09	85	0.06	0.059	0.36	0	N/A	0.00	6.45	6.45	9.45	0.53	3.31
E1	1.39	100	0.05	0.050	6.55	100	0.05	0.050	0.46	205	3.00	1.14	8.15	8.15	8.80	0.62	7.58
E2	0.35	100	0.0244	0.024	8.73	37	0.03	0.027	0.23	44	3.00	0.24	9.20	9.20	8.44	0.48	1.42
E1+E2	1.74	100	0.05	0.050	6.55	100	0.05	0.050	0.46	387	3.00	2.15	9.16	9.16	8.45	0.59	8.71
F	0.685	100	0.045	0.045	6.83	30	0.03	0.033	0.17	212	3.00	1.18	8.18	8.18	8.79	0.63	3.79
G	0.535	100	0.02	0.020	9.45	48	0.04	0.042	0.24	120	4.00	0.50	10.19	10.19	8.13	0.58	2.52
H	0.47	100	0.035	0.035	7.55	65	0.03	0.031	0.38	37	3.00	0.21	8.14	8.14	8.80	0.57	2.36
I	0.26	45	0.0511	0.051	3.43	0	0.00	0.005	0.00	100	3.00	0.56	3.98	5.00	10.11	0.36	0.95
J	0.62	100	0.05	0.050	6.55	38	0.08	0.079	0.14	165	3.00	0.92	7.61	7.61	9.00	0.62	3.46
K	0.66	100	0.04	0.040	7.16	102	0.07	0.069	0.40	0	N/A	0.00	7.56	7.56	9.01	0.54	3.21
L	2.52	100	0.025	0.025	8.64	332	0.05	0.048	1.56	335	5.00	1.12	11.32	11.32	7.81	0.53	10.44

Formulas/ Equations

Time of Concentration $T_c = T_t(\text{Sheet}) + T_t(\text{Shall Concen}) + T_t(\text{Channel})$

Sheet Flow $T_t = \frac{0.007((nL)^{0.8})}{((P^2)^{0.5})(s)^{0.4}}$ COA Table 2-3: $P \geq 3.44$ in COA Table 2-2: $n = 0.15$

Shallow/ Concen. Flow $T_t = \frac{L}{(60(16.1345)(s)^{0.5})}$ $S \geq 0.5\%$ (0.005 Ft/Ft) $T_c \geq 5$ mins

Channel Flow $T_t = \frac{L}{V/60}$ $V = \text{approx. velocity based on running slope}$

$Q = CiA$ COA Table 2-1: $C = \text{Grass Flat slope} = 0.34$ $\text{Grass Avg Slope} = 0.42$ $\text{Impervious (roof/pavement)} = 0.87$

$i = a/(T_c + b)^c$ (For $T_c = 5$ mins., COA Table 2-4 25yr. 5 min. value of 10.1 is used, all others use equation. $a = 82.93$ $b = 10.74$ $c = 0.7634$)

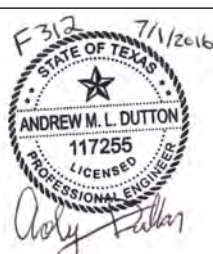
NOTES:

- 1) HYDRAULIC COMPUTATIONS ARE BASED ON CITY OF ROUND ROCK DRAINAGE SPECIFICATIONS.
- 2) RATIONAL METHOD WAS USED TO COMPUTE PEAK FLOWS.

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
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 ROUND ROCK, TX 78681



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DRAINAGE CALCULATIONS



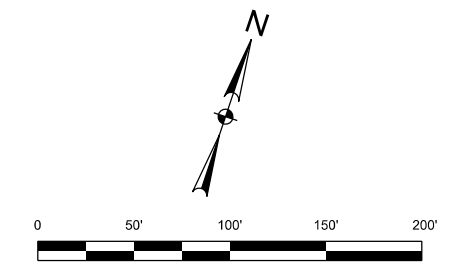
PARK DR

EAGLE WAY

BRUSHY CREEK MUD
PARK DR
ROUND ROCK, TX 78681

AQUAMARINE DR

POTENTIAL GRANITE & SPOILS STAGING AREA
CONTRACTOR TO LAY DOWN TARP BEFORE UTILIZING STAGING AREA
70 SY HYDRO-MULCHING (IF UTILIZED)
64 LF SILT FENCE (IF UTILIZED)
BASE BID 1



- GENERAL NOTES**
- 1) EROSION CONTROL & TREE PROTECTION MEASURES SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE INTENDED TO AIDE THE CONTRACTOR IN PREPARATION OF SWPPP.
 - 2) ALL TREES WITHIN THE LIMITS OF CONSTRUCTION TO BE PROTECTED UNLESS OTHERWISE NOTED, ALL TREES WITHIN THE CONSTRUCTION LIMITS NOT SHOWN TO BE EITHER PROTECTED OR REMOVED SHALL BE CONSIDERED TO REMAIN, IF REMOVAL IS REQUIRED, COSTS WILL BE CONSIDERED SUBSIDIARY TO THE PROJECT.
 - 3) EROSION/SEDIMENTATION CONTROLS WILL BE IN PLACE PRIOR TO ANY OTHER CONSTRUCTION ACTIVITIES.
 - 4) CONTRACTOR SHALL NOT PERFORM ANY WORK OUTSIDE OF R.O.W WITHOUT TEMPORARY CONSTRUCTION EASEMENT.

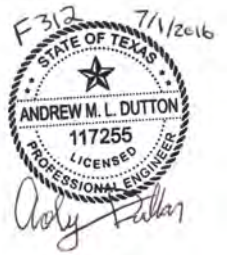
- LEGEND**
- SILT FENCE FOR EROSION CONTROL
 - HYDRO-MULCH
 - PROPOSED GRANITE TRAIL
 - EXISTING TREE
 - PROPOSED CONTOUR
 - CONSTRUCTION ENTRANCE
 - STAGING AND STORAGE AREA

MATCHLINE SHEET 15

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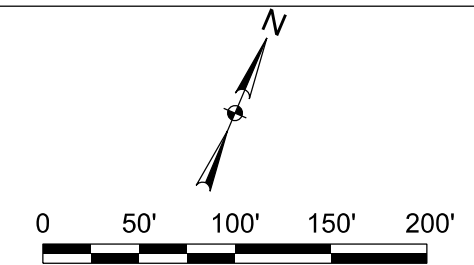
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Sheet Title

**CONSTRUCTION
ENTRANCES & STAGING**

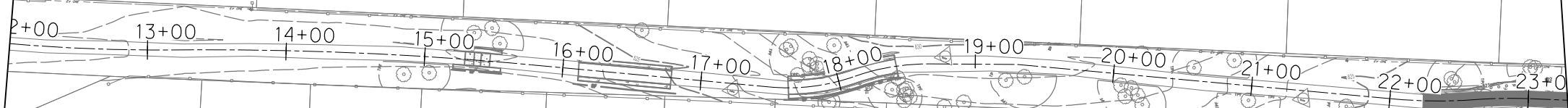
MATCHLINE SHEET 14



- GENERAL NOTES**
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- LEGEND**
- SILT FENCE FOR EROSION CONTROL
 - HYDRO-MULCH
 - PROPOSED GRANITE TRAIL
 - EXISTING TREE
 - PROPOSED CONTOUR
 - CONSTRUCTION ENTRANCE
 - STAGING AND STORAGE AREA

EAGLE WAY



MATCHLINE SHEET 16

TOURMALINE TRL

WALSH RANCH

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
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16318 GREAT OAKS DR.
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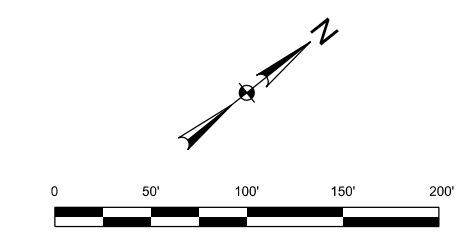
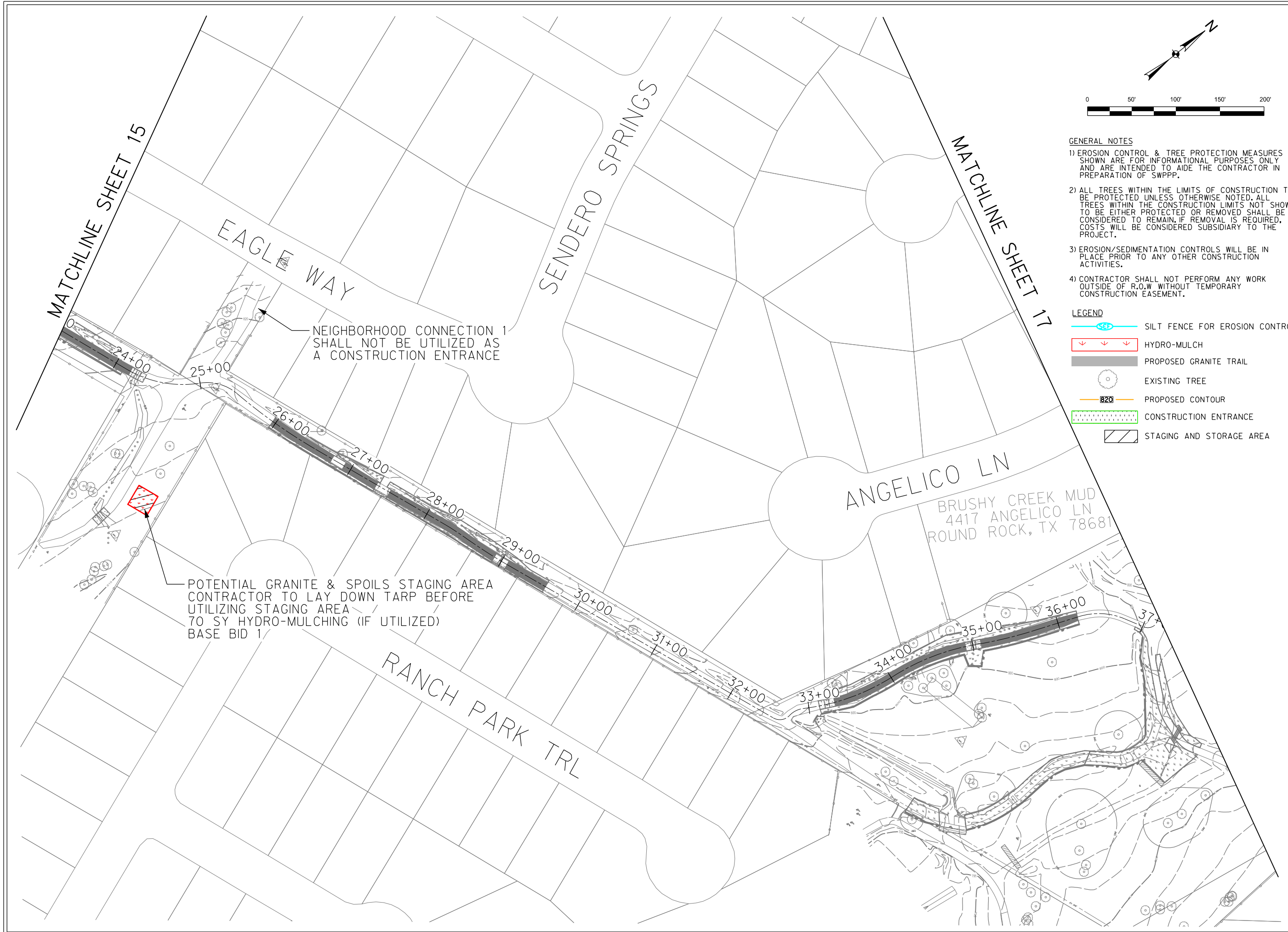
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CONSTRUCTION
ENTRANCES & STAGING

15
Sheet Number



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- LEGEND**
- SILT FENCE FOR EROSION CONTROL
 - HYDRO-MULCH
 - PROPOSED GRANITE TRAIL
 - EXISTING TREE
 - PROPOSED CONTOUR
 - CONSTRUCTION ENTRANCE
 - STAGING AND STORAGE AREA

NEIGHBORHOOD CONNECTION 1 SHALL NOT BE UTILIZED AS A CONSTRUCTION ENTRANCE

POTENTIAL GRANITE & SPOILS STAGING AREA CONTRACTOR TO LAY DOWN TARP BEFORE UTILIZING STAGING AREA 70 SY HYDRO-MULCHING (IF UTILIZED) BASE BID 1

BRUSHY CREEK MUD
4417 ANGELICO LN
ROUND ROCK, TX 78681

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
BRUSHY CREEK MUD
16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



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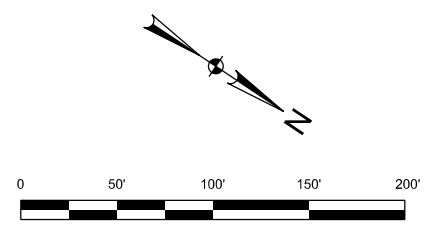
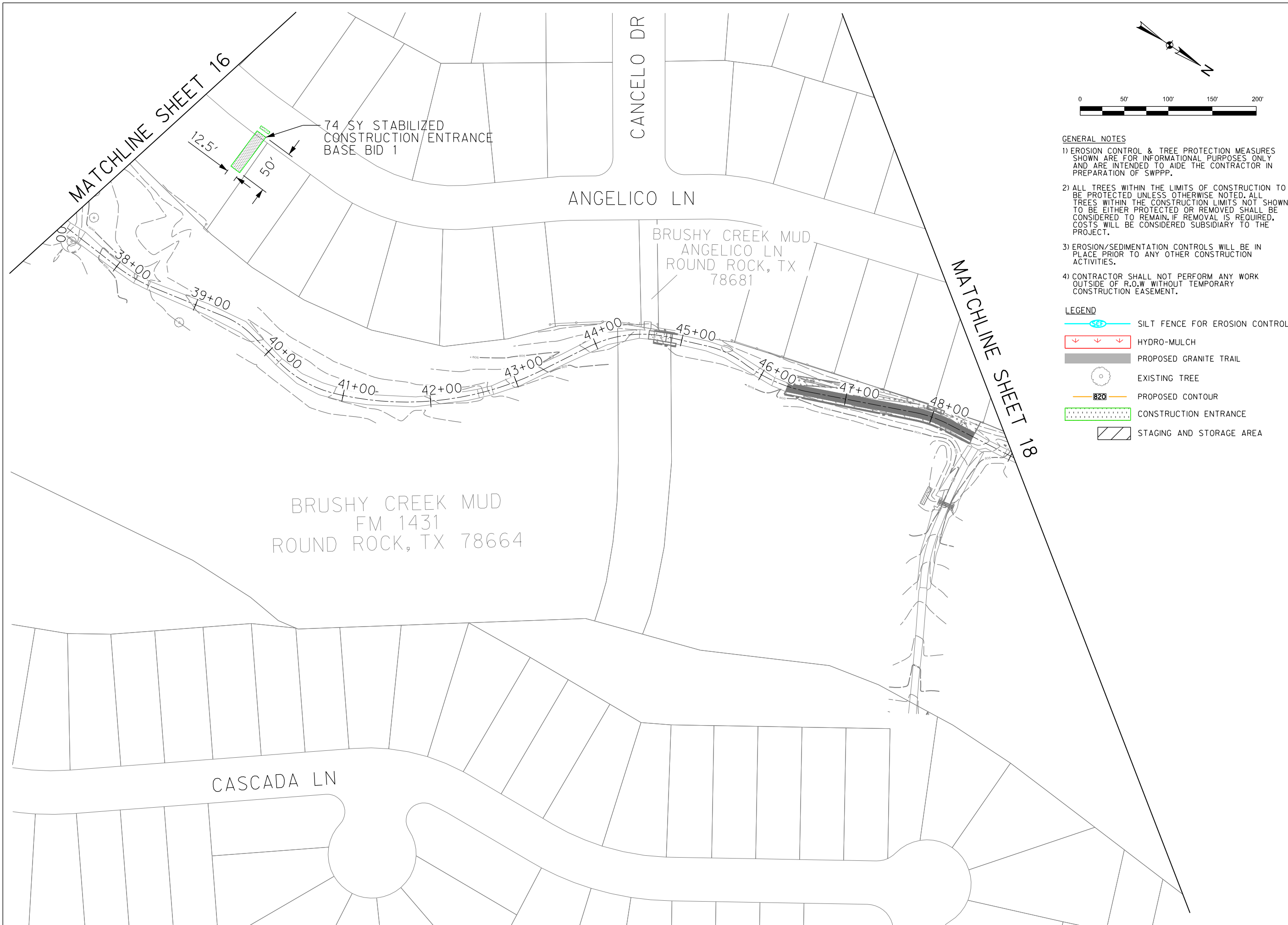
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CONSTRUCTION ENTRANCES & STAGING

16
Sheet Number



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- LEGEND**
- SILT FENCE FOR EROSION CONTROL
 - HYDRO-MULCH
 - PROPOSED GRANITE TRAIL
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 - CONSTRUCTION ENTRANCE
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**SENDERO SPRINGS
TRAIL & DRAINAGE
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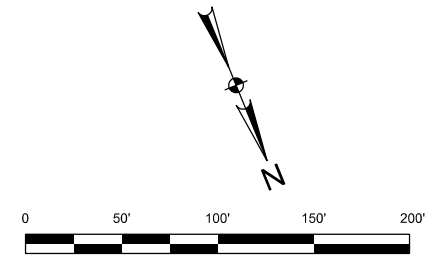
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**CONSTRUCTION
ENTRANCES & STAGING**
Sheet Number:
17

MATCHLINE SHEET 17



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**SENDERO SPRINGS
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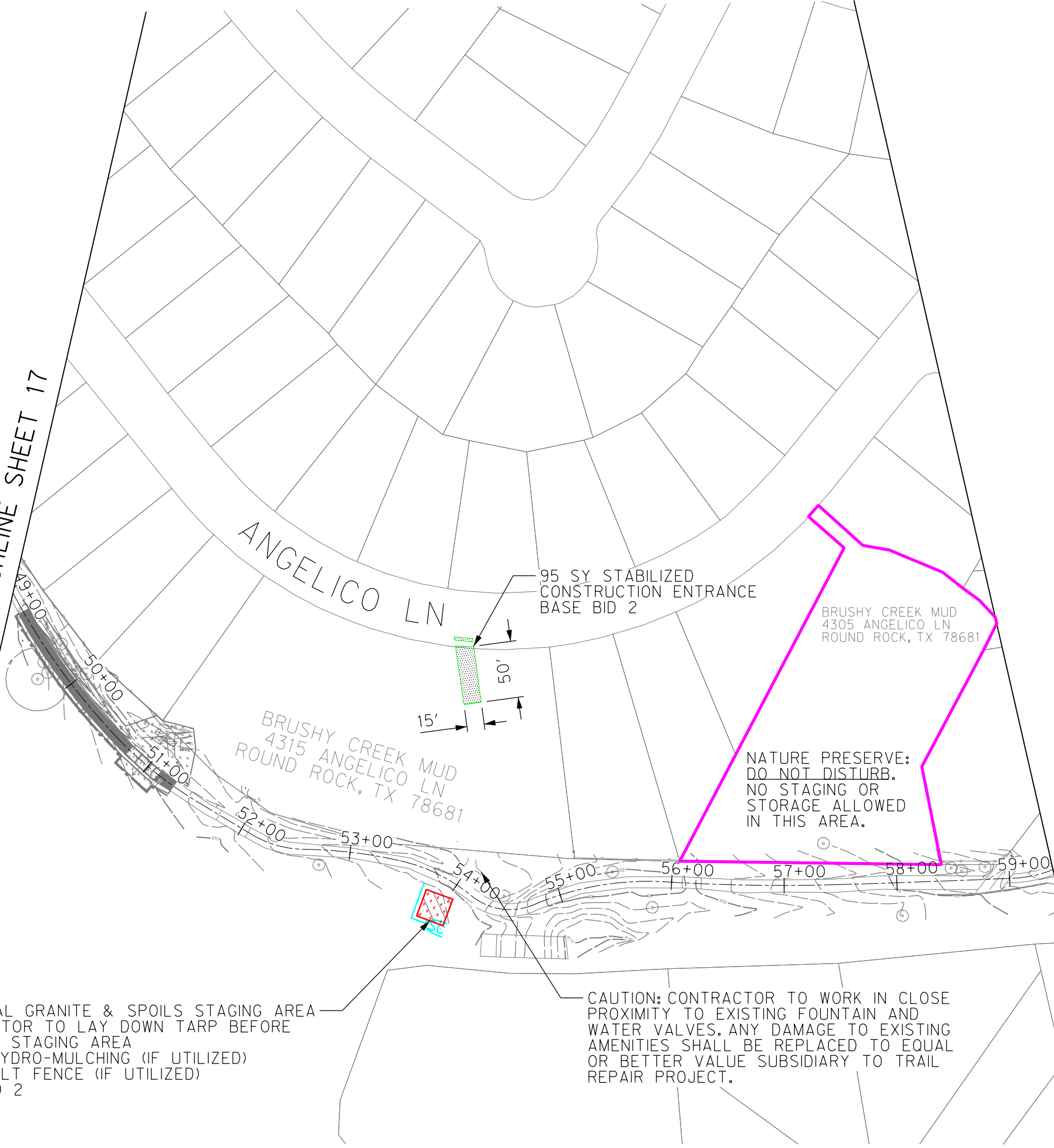
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CONSTRUCTION
ENTRANCES & STAGING

18
Sheet Number



95 SY STABILIZED
CONSTRUCTION ENTRANCE
BASE BID 2

BRUSHY CREEK MUD
4305 ANGELICO LN
ROUND ROCK, TX 78681

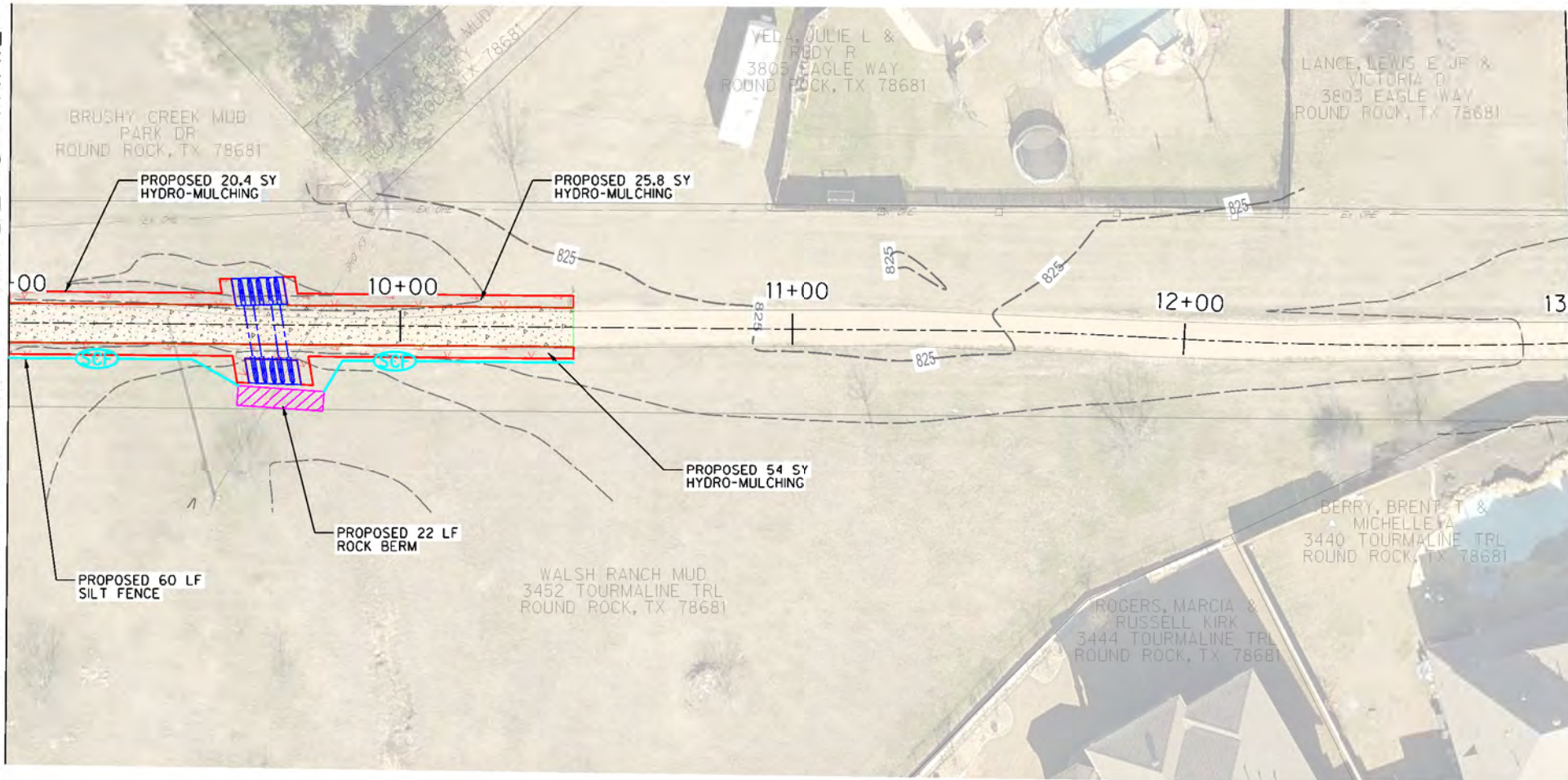
BRUSHY CREEK MUD
4315 ANGELICO LN
ROUND ROCK, TX 78681

NATURE PRESERVE:
DO NOT DISTURB.
NO STAGING OR
STORAGE ALLOWED
IN THIS AREA.

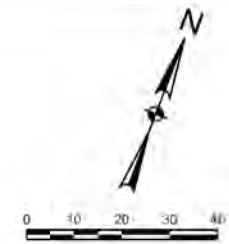
POTENTIAL GRANITE & SPOILS STAGING AREA
CONTRACTOR TO LAY DOWN TARP BEFORE
UTILIZING STAGING AREA
70 SY HYDRO-MULCHING (IF UTILIZED)
64 LF SILT FENCE (IF UTILIZED)
BASE BID 2

CAUTION: CONTRACTOR TO WORK IN CLOSE
PROXIMITY TO EXISTING FOUNTAIN AND
WATER VALVES. ANY DAMAGE TO EXISTING
AMENITIES SHALL BE REPLACED TO EQUAL
OR BETTER VALUE SUBSIDIARY TO TRAIL
REPAIR PROJECT.

MATCHLINE STA 9+00 ~ SENDERO TRAIL



MATCHLINE STA 13+00 ~ SENDERO TRAIL



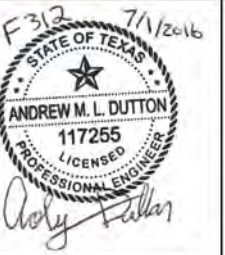
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- LEGEND**
- TPF TREE PROTECTION FENCE
 - SILT FENCE FOR EROSION CONTROL
 - ROCK BERM
 - HYDRO-MULCH
 - PROPOSED CONCRETE PAVEMENT
 - PROPOSED GRANITE TRAIL
 - EXISTING TREE
 - 825 PROPOSED CONTOUR

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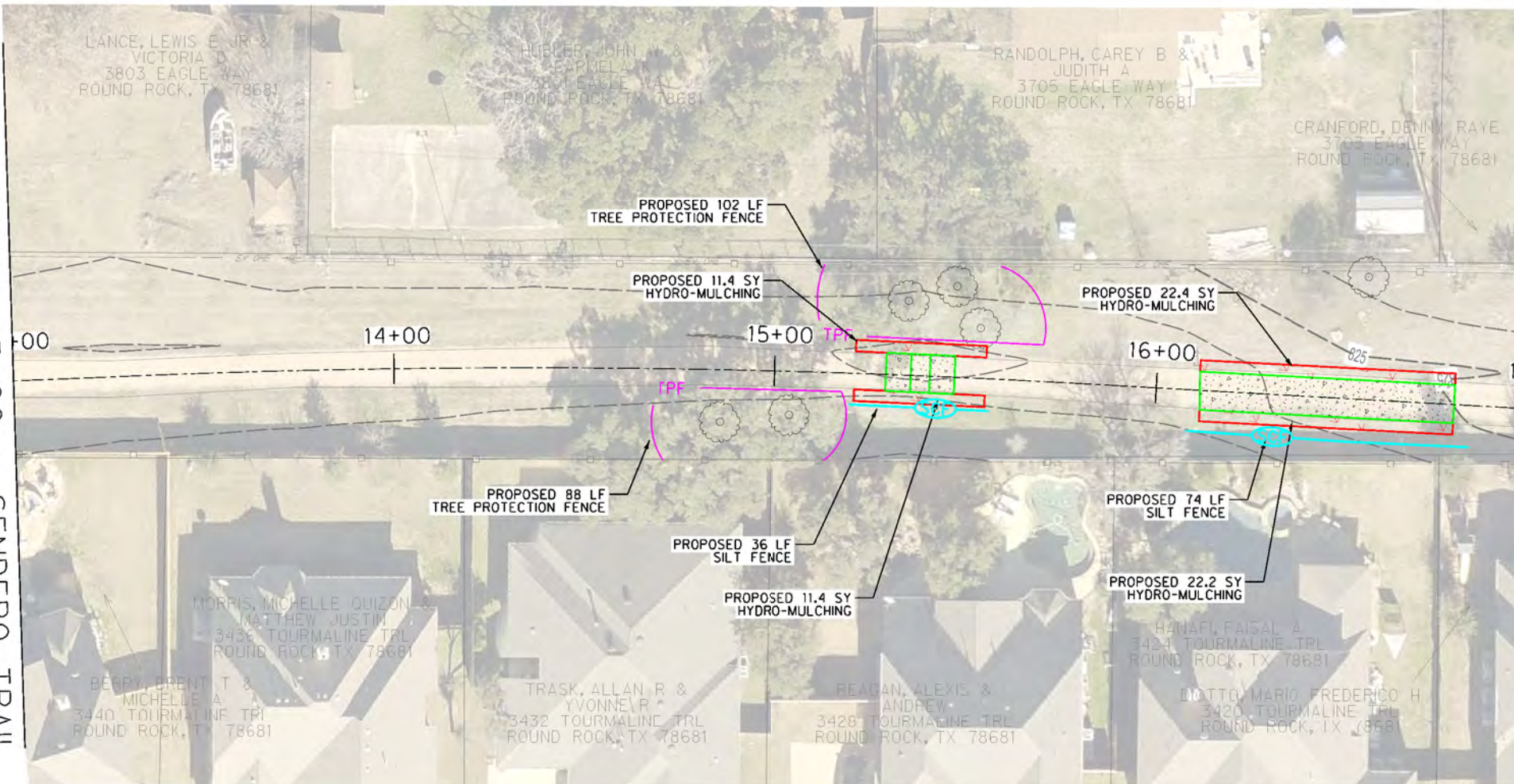


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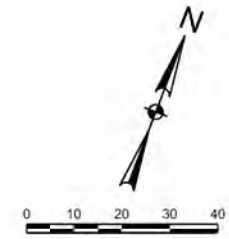
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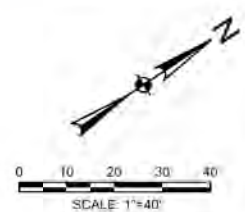
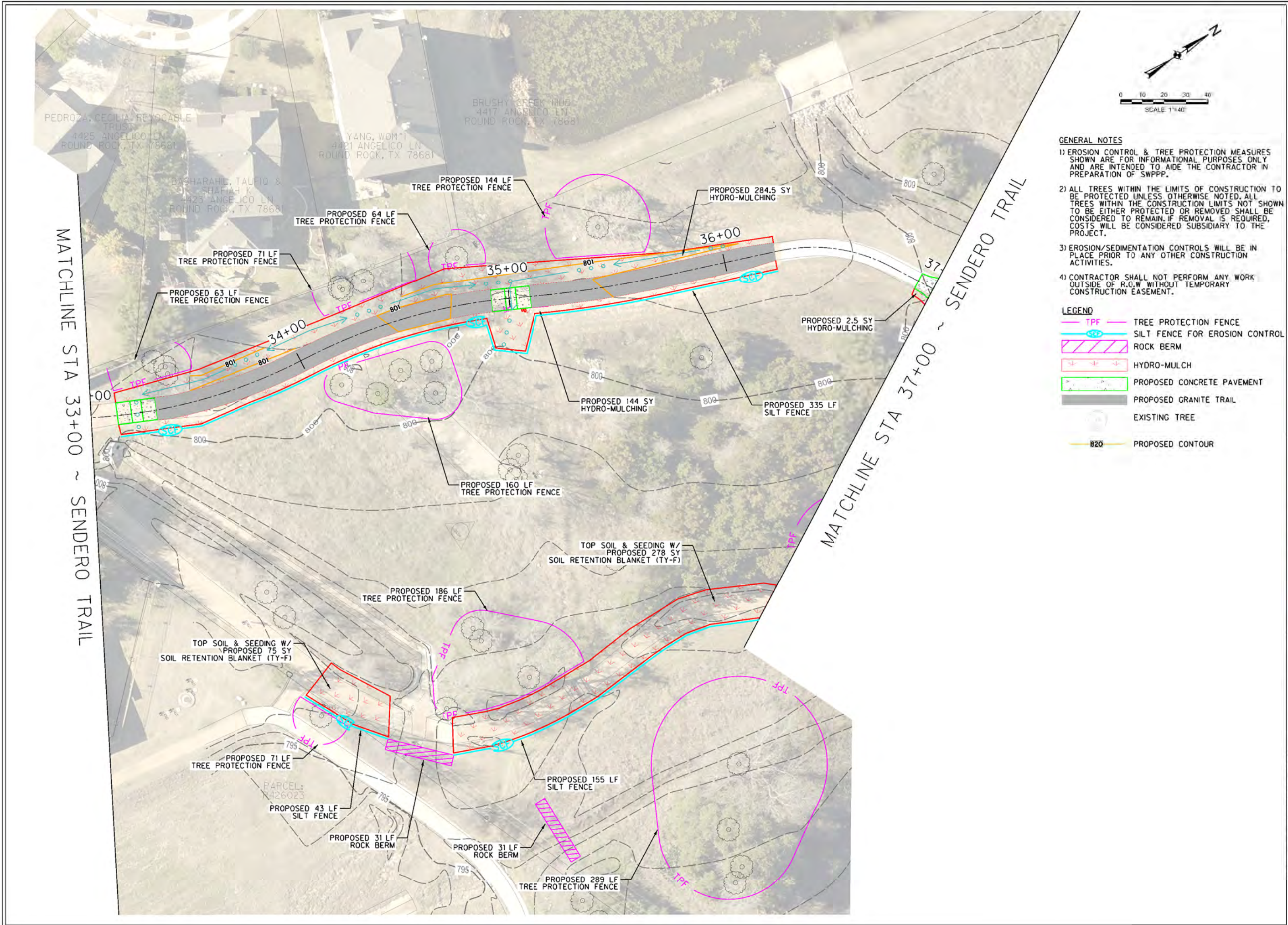
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 Checked by: JH
EROSION CONTROL
 FROM STA 9+00 TO STA 17+00
 20
 Sheet Number

MATCHLINE STA 13+00 ~ SENDERO TRAIL

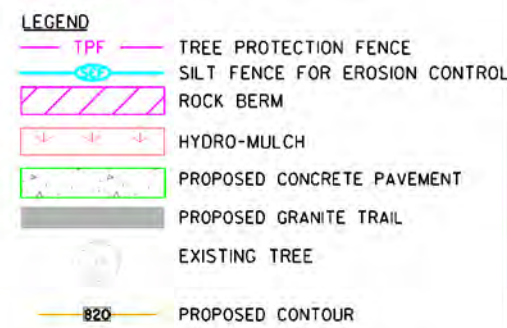


MATCHLINE STA 17+00 ~ SENDERO TRAIL





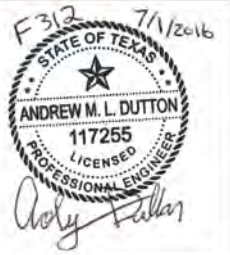
- GENERAL NOTES**
- 1) EROSION CONTROL & TREE PROTECTION MEASURES SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE INTENDED TO AIDE THE CONTRACTOR IN PREPARATION OF SWPPP.
 - 2) ALL TREES WITHIN THE LIMITS OF CONSTRUCTION TO BE PROTECTED UNLESS OTHERWISE NOTED. ALL TREES WITHIN THE CONSTRUCTION LIMITS NOT SHOWN TO BE EITHER PROTECTED OR REMOVED SHALL BE CONSIDERED TO REMAIN. IF REMOVAL IS REQUIRED, COSTS WILL BE CONSIDERED SUBSIDIARY TO THE PROJECT.
 - 3) EROSION/SEDIMENTATION CONTROLS WILL BE IN PLACE PRIOR TO ANY OTHER CONSTRUCTION ACTIVITIES.
 - 4) CONTRACTOR SHALL NOT PERFORM ANY WORK OUTSIDE OF R.O.W WITHOUT TEMPORARY CONSTRUCTION EASEMENT.



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EROSION CONTROL
 FROM STA 33+00 TO STA 37+00

- ALL TREES NOT LOCATED WITHIN THE LIMITS OF CONSTRUCTION AND OUTSIDE OF DISTURBED AREAS SHALL BE PRESERVED. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL TREES TO BE PRESERVED FROM HIS ACTIVITIES.
- ALL TREES SHOWN TO BE RETAINED WITHIN THE LIMITS OF CONSTRUCTION ON THE PLANS, SHALL BE PROTECTED DURING CONSTRUCTION WITH FENCING. SEE: TREE PROTECTION TREE WELLS (EC-02), TREE PROTECTION TREE LOCATION (EC-03) AND TREE PROTECTION FENCE-CHAIN LINK (EC-04).
- TREE PROTECTION FENCES SHALL BE ERECTED ACCORDING TO CITY STANDARDS FOR TREE PROTECTION, INCLUDING TYPES OF FENCING AND SIGNAGE.
- TREE PROTECTION FENCES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF ANY SITE PREPARATION WORK (CLEARING, GRUBBING, OR GRADING) AND SHALL BE MAINTAINED THROUGHOUT ALL PHASES OF THE CONSTRUCTION PROJECT.
- EROSION AND SEDIMENTATION CONTROL BARRIERS SHALL BE INSTALLED OR MAINTAINED IN A MANNER WHICH DOES NOT RESULT IN SOIL BUILD-UP WITHIN TREE DRIPLEINES.
- FENCES SHALL COMPLETELY SURROUND THE TREE OR CLUSTERS OF TREES, LOCATED AT THE OUTERMOST LIMITS OF THE TREE BRANCHES (DRIPLINE) OR CRITICAL ROOT ZONE (CRZ), WHICHEVER IS GREATER; AND SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PROJECT IN ORDER TO PREVENT THE FOLLOWING:
 - SOIL COMPACTION IN CRZ AREA RESULTING FROM VEHICULAR TRAFFIC OR STORAGE OF EQUIPMENT OR MATERIAL.
 - CRZ DISTURBANCES DUE TO GRADE CHANGES OR TRENCHING NOT REVIEWED AND AUTHORIZED BY THE FORESTRY MANAGER.
 - WOUNDS TO EXPOSED ROOTS, TRUNK, OR LIMBS BY MECHANICAL EQUIPMENT
 - OTHER ACTIVITIES DETRIMENTAL TO TREES SUCH AS CHEMICAL STORAGE, CONCRETE TRUCK CLEANING, AND FIRES.
- EXCEPTIONS TO INSTALLING TREE FENCES AT THE TREE DRIPLEINES OR CRZ, WHICHEVER IS GREATER, MAY BE PERMITTED IN THE FOLLOWING CASES:
 - WHERE THERE IS TO BE AN APPROVED GRADE CHANGE, IMPERMEABLE PAVING SURFACE, OR TREE WELL;
 - WHERE PERMEABLE PAVING IS TO BE INSTALLED, ERECT THE FENCE AT THE OUTER LIMITS OF THE PERMEABLE PAVING AREA.
 - WHERE TREES ARE CLOSE TO PROPOSED BUILDINGS, ERECT THE FENCE NO CLOSER THAN 6 FEET TO THE BUILDING.
 - WHERE THERE ARE SEVERE SPACE CONSTRAINTS DUE TO TRACT SIZE, OR OTHER SPECIAL REQUIREMENTS, CONTACT THE FORESTRY MANAGER TO DISCUSS ALTERNATIVES.
- WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN A FENCE THAT IS CLOSER THAN 5 FEET TO A TREE TRUNK, THE TRUNK SHALL BE PROTECTED BY STRAPPED-ON PLANKING TO A HEIGHT OF 8 FEET (OR TO THE LIMITS OF LOWER BRANCHING) IN ADDITION TO THE REDUCED FENCING PROVIDED.
- WHERE ANY OF THE ABOVE EXCEPTIONS RESULT IN AREAS OF UNPROTECTED ROOT ZONES UNDER THE DRIPLINE OR CRZ, WHICHEVER IS GREATER, THOSE AREAS SHOULD BE COVERED WITH 4 INCHES OF ORGANIC MULCH TO MINIMIZE SOIL COMPACTION.
- ALL GRADING WITHIN CRZ AREAS SHALL BE DONE BY HAND OR WITH SMALL EQUIPMENT TO MINIMIZE ROOT DAMAGE. PRIOR TO GRADING, RELOCATE PROTECTIVE FENCING TO 2 FEET BEHIND THE GRADE CHANGE AREA.
- ANY ROOTS EXPOSED BY CONSTRUCTION ACTIVITY SHALL BE PRUNED FLUSH WITH THE SOIL AND BACKFILLED WITH GOOD QUALITY TOP SOIL WITHIN TWO DAYS. IF EXPOSED ROOT AREAS CANNOT BE BACKFILLED WITHIN 2 DAYS, AN ORGANIC MATERIAL WHICH REDUCES SOIL TEMPERATURE AND MINIMIZES WATER LOSS DUE TO EVAPORATION SHALL BE PLACED TO COVER THE ROOTS UNTIL BACKFILL CAN OCCUR.
- PRIOR TO EXCAVATION OR GRADE CUTTING WITHIN TREE DRIPLEINES, A CLEAN CUT SHALL BE MADE WITH A ROCK SAW OR SIMILAR EQUIPMENT, IN A LOCATION AND TO A DEPTH APPROVED BY THE FORESTRY MANAGER, TO MINIMIZE DAMAGE TO REMAINING ROOTS.
- TREES MOST HEAVILY IMPACTED BY CONSTRUCTION ACTIVITIES WILL BE WATERED DEEPLY ONCE A WEEK DURING PERIODS OF HOT, DRY WEATHER. TREE CROWNS ARE TO BE SPRAYED WITH WATER PERIODICALLY TO REDUCE DUST ACCUMULATION ON LEAVES.
- WHEN INSTALLING CONCRETE ADJACENT TO THE ROOT ZONE OF A TREE, A PLASTIC VAPOR BARRIER SHALL BE PLACED BEHIND THE CONCRETE TO PROHIBIT LEACHING OF LIME INTO THE CRZ.
- ANY TRENCHING REQUIRED FOR THE INSTALLATION OF LANDSCAPE IRRIGATION SHALL BE PLACED AS FAR FROM EXISTING TREE TRUNKS AS POSSIBLE.
- NO LANDSCAPE TOPSOIL DRESSING GREATER THAN FOUR (4) INCHES SHALL BE PERMITTED WITHIN THE DRIPLINE OR CRZ OF TREES, WHICHEVER IS GREATER. NO TOPSOIL IS PERMITTED ON ROOT FLARES OF ANY TREE.
- PRUNING TO PROVIDE CLEARANCE FOR STRUCTURES, VEHICULAR TRAFFIC, AND CONSTRUCTION EQUIPMENT SHALL TAKE PLACE BEFORE CONSTRUCTION BEGINS. ALL PRUNING MUST BE DONE ACCORDING TO CITY STANDARDS AND AS OUTLINED IN LITERATURE PROVIDED BY THE INTERNATIONAL SOCIETY OF ARBORICULTURE (ISA PRUNING TECHNIQUES).
- ALL OAK TREE CUTS, INTENTIONAL OR UNINTENTIONAL, SHALL BE SEALED WITH AN APPROVED PRUNING SEALER IMMEDIATELY (WITHIN 10 MINUTES). TREE PAINT MUST BE KEPT ON SITE AT ALL TIMES.
- THE FORESTRY MANAGER HAS THE AUTHORITY TO REQUIRE ADDITIONAL TREE PROTECTION BEFORE OR DURING CONSTRUCTION.
- TREES APPROVED FOR REMOVAL SHALL BE REMOVED IN A MANNER WHICH DOES NOT IMPACT TREES TO BE PRESERVED. REFER TO THE CITY OF ROUND ROCK TREE TECHNICAL MANUAL FOR APPROPRIATE REMOVAL METHODS.
- PRIOR TO CONSTRUCTION, ALL LOWER TREE LIMBS OVER ROADWAYS MUST BE PRUNED TO A HEIGHT OF 14 FEET USING THE TECHNIQUES DESCRIBED IN THE CITY OF ROUND ROCK TREE TECHNICAL MANUAL.
- DEVIATIONS FROM THE ABOVE REQUIREMENTS AND NEGLIGENT DAMAGE TO TREES MAY BE CONSIDERED AS ORDINANCE VIOLATIONS.

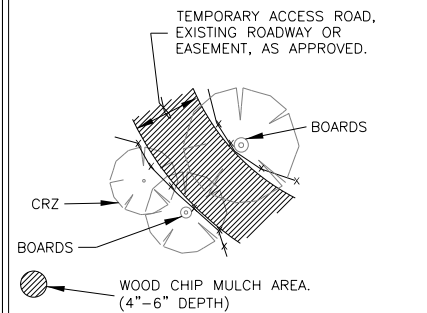
FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

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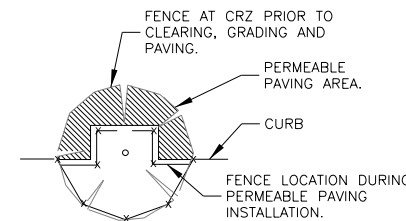
CITY OF ROUND ROCK

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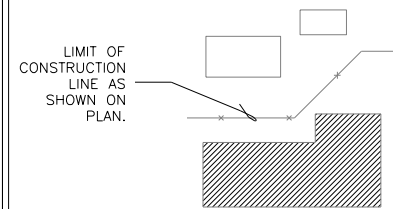
TREE PROTECTION NOTES



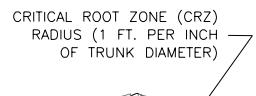
LINEAR CONSTRUCTION THROUGH TREES



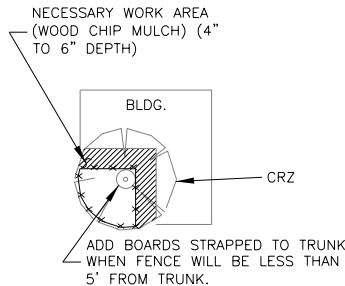
TREES IN PAVING AREA



NATURAL AREAS



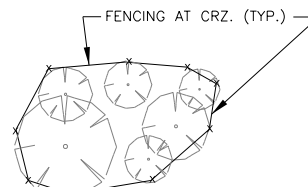
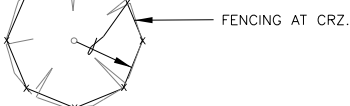
INDIVIDUAL TREE



TREES NEAR CONSTRUCTION ACTIVITY

NOTE:

LIMITS OF MULCH AREAS AND DISTANCE FROM TRUNKS TO WORK/PERMEABLE PAVING AREAS SHALL BE SUBJECT TO THE APPROVAL OF THE FORESTRY MANAGER.



GROUP OF TREES

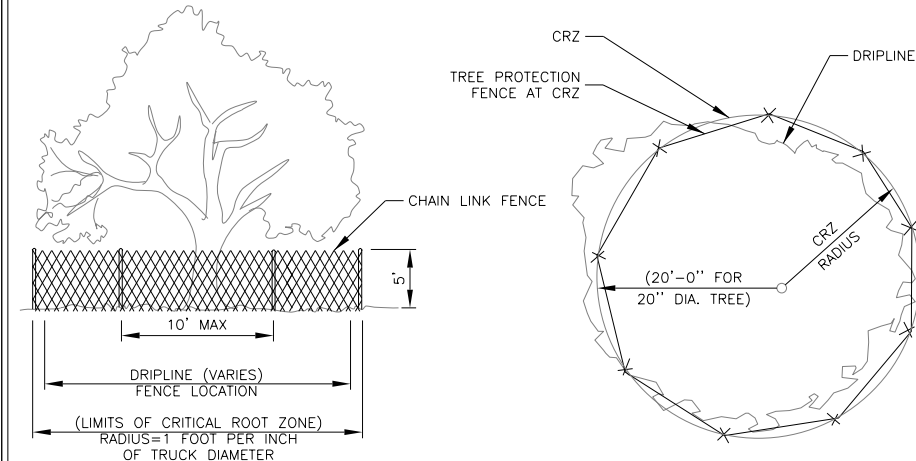
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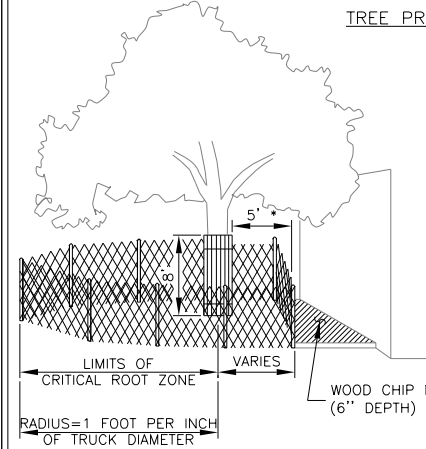
TREE PROTECTION FENCE LOCATIONS



TREE PROTECTION FENCE - CHAIN LINK

NOTE:

LIMITS OF WOOD CHIP MULCH AREA AND DISTANCE FROM TRUNK TO WORK AREA SHALL BE SUBJECT TO THE APPROVAL OF THE FORESTRY MANAGER.



TREE PROTECTION FENCE (MODIFIED) - CHAIN LINK

*AS NEEDED TO PROVIDE NECESSARY WORK SPACE. IF LESS THAN 5', THEN ADD BOARDS STRAPPED TO TRUNK.

FOR QUESTIONS CONCERNING THIS DETAIL, PLEASE CONTACT THE FORESTRY MANAGER.

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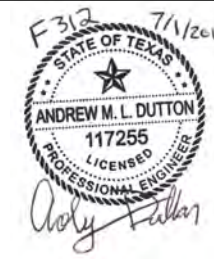
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TREE PROTECTION FENCE CHAIN LINK



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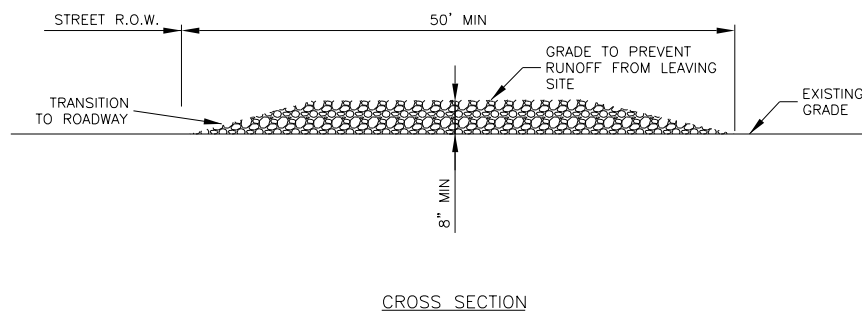


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CROSS SECTION

NOTES:

1. STONE SIZE SHALL BE 3" - 8" OPEN GRADED ROCK.
2. THICKNESS OF CRUSHED STONE PAD TO BE NOT LESS THAN 8".
3. LENGTH SHALL BE A MINIMUM OF 50' FROM ACTUAL ROADWAY, AND WIDTH NOT LESS THAN FULL WIDTH OF INGRESS/EGRESS.
4. ENTRANCE SHALL BE PROPERLY GRADED TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.
5. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY BY CONTRACTOR.
6. AS NECESSARY, WHEELS MUST BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

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CITY OF ROUND ROCK

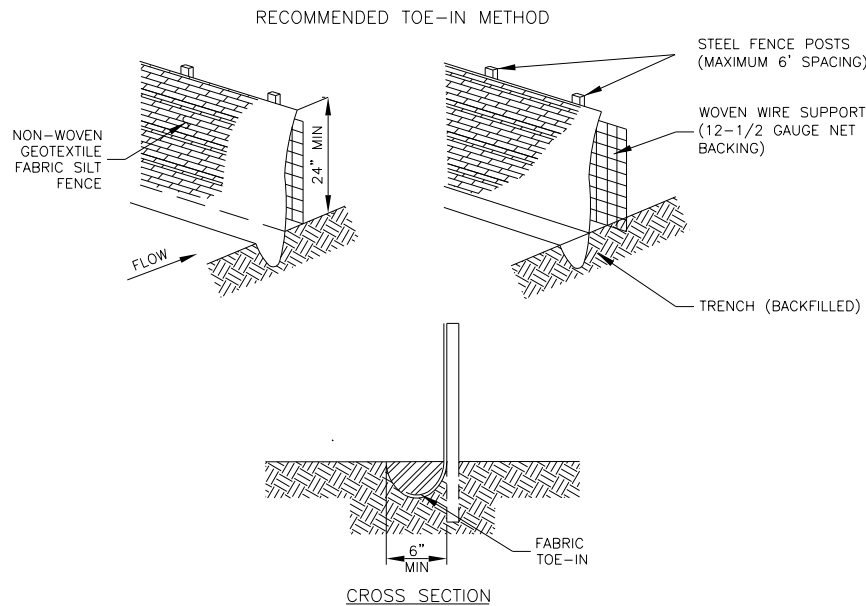
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03-25-11 DATE

STABILIZED CONSTRUCTION ENTRANCE DETAIL



THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)



CROSS SECTION

NOTES:

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MIN. OF ONE (1') FOOT.
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT) WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHALL BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS SECURELY FASTENED TO THE STEEL FENCE POSTS.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 6 INCHES. THE SILT SHALL BE DISPOSED OF IN AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. SILT FENCE SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED

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CITY OF ROUND ROCK

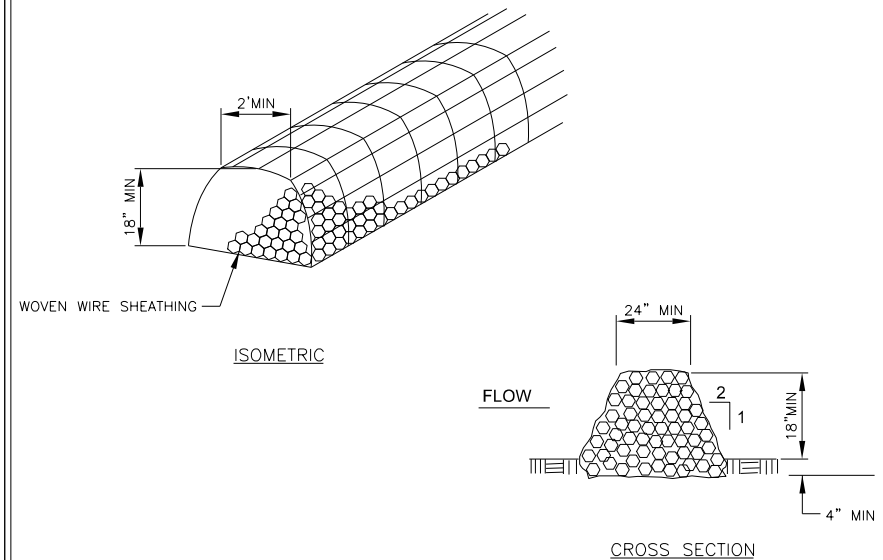
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SILT FENCE DETAIL



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CROSS SECTION

NOTES:

1. USE ONLY OPEN GRADED ROCK (3 TO 5") DIAMETER FOR ALL CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 1" OPENING AND MINIMUM WIRE DIAMETER OF 20 GAUGE.
3. THE ROCK BERM SHALL BE INSPECTED DAILY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SEDIMENT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. IF SEDIMENT REACHES A DEPTH OF 6", THE SEDIMENT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SEDIMENTATION PROBLEM.
5. WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

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CITY OF ROUND ROCK

DRAWING NO: EC-12

03-25-11 DATE

ROCK BERM DETAIL



THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)

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EROSION CONTROL DETAILS

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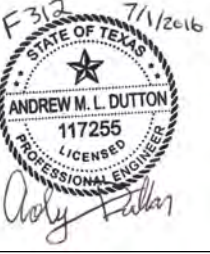
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Sheet Number

**SENDERO SPRINGS
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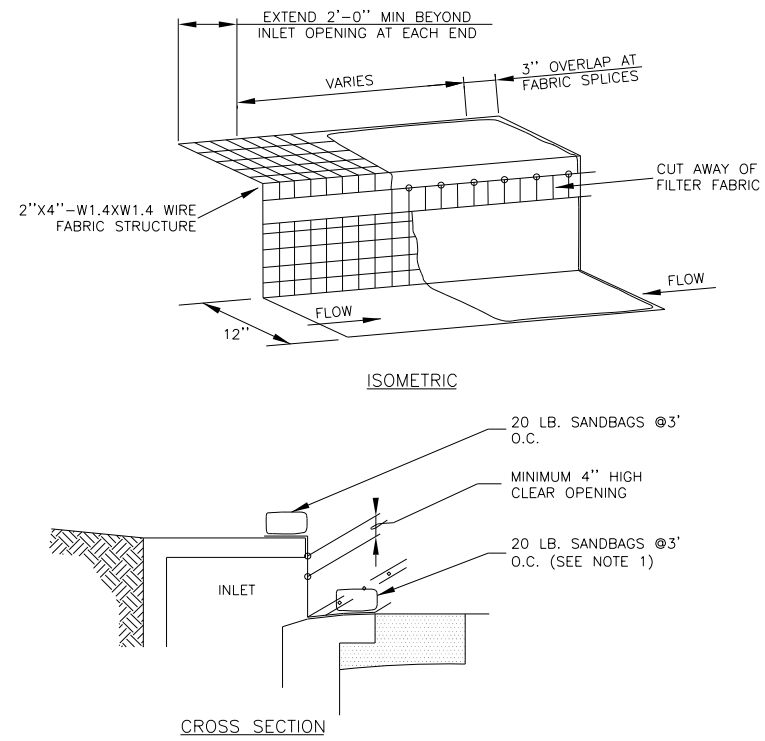
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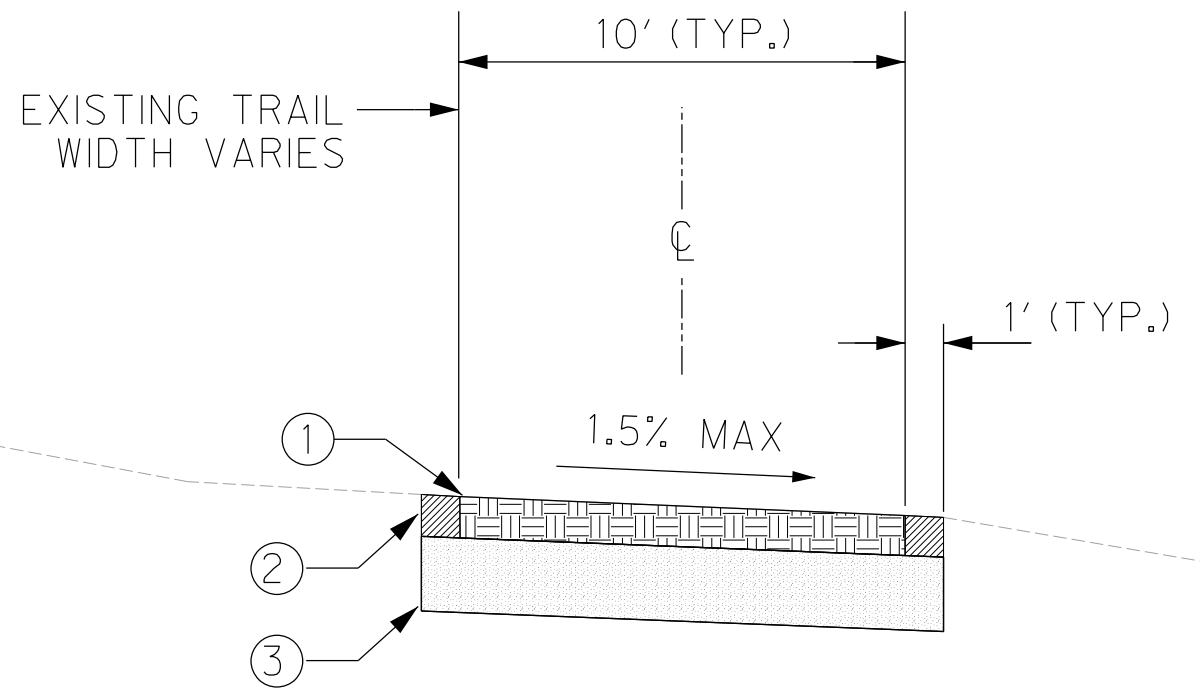
**EROSION CONTROL
DETAILS**

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- NOTES:**
- WHERE MINIMUM CLEARANCES CAUSE TRAFFIC TO DRIVE IN THE GUTTER, THE CONTRACTOR MAY SUBSTITUTE A 1" X 4" BOARD SECURED WITH CONCRETE NAILS 3' O.C. NAILED INTO THE GUTTER IN LIEU OF SANDBAGS TO HOLD THE FILTER DIKE IN PLACE. UPON REMOVAL, CLEAN ANY DIRT/DEBRIS FROM NAILING LOCATIONS, APPLY CHEMICAL SANDING AGENT AND APPLY NON-SHRINK GROUT FLUSH WITH SURFACE OF GUTTER.
 - A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL OR AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR HOG RINGS AT THIS LOCATION.
 - DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".
 - CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM-WATER BEGINS TO OVERTOP THE CURB.
 - INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.

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THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR THE APPROPRIATE USE OF THIS DETAIL. (NOT TO SCALE)	CURB INLET PROTECTION DETAIL	



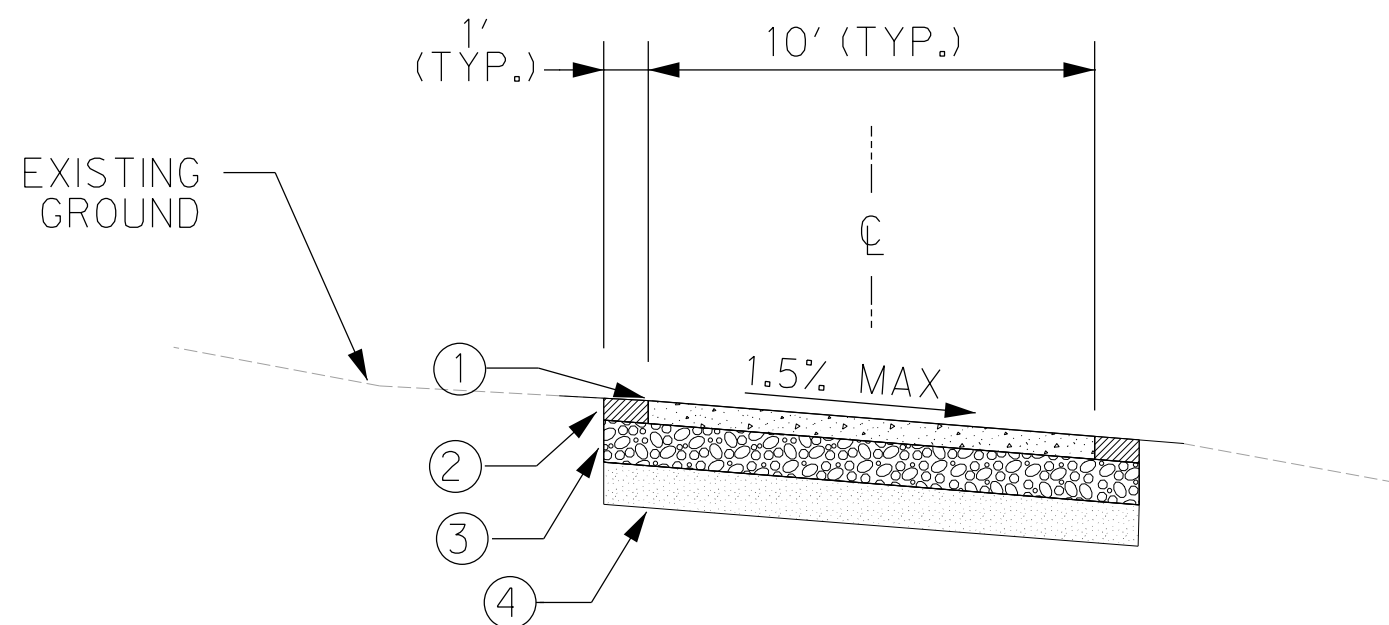
PROPOSED TYPICAL GRAVEL TRAIL CROSS SECTION N.T.S.

GRAVEL TRAIL SECTION

- ① 5" COMPACTED CRUSHED GRANITE
- ② EMBANKMENT
- ③ 6" SUBGRADE PREPARATION

NOTES:

1. THE TRAIL SECTION REFERENCES THE CITY OF AUSTIN (COA) STANDARD SPECIFICATION NO. 1301S.
2. CONTRACTOR SHALL ENSURE NO PONDING OCCURS ON THE PATH.
3. ALL SUBGRADE SHALL BE EXCAVATED AND SHAPED IN CONFORMITY WITH THE TYPICAL SECTIONS SHOWN ON THE DRAWINGS.
4. THE SUBGRADE SHALL BE TESTED BY "PROOF ROLLING" AND SHALL CONFORM COA STANDARD SPECIFICATION ITEM NO. 236S.
5. FIELD DENSITY DETERMINATIONS SHALL BE MADE IN ACCORDANCE WITH TXDOT TEST METHOD TEX-115-E.
6. THE SURFACE LAYER SHALL BE SPRINKLED AS REQUIRED TO BRING THE MATERIAL TO OPTIMUM MOISTURE CONTENT, THEN COMPACTED IN ACCORDANCE WITH COA STANDARD SPECIFICATION ITEM NO. 210S, "FLEXIBLE BASE" TO THE EXTENT NECESSARY TO PROVIDE NOT LESS THAN 92% OF THE OPTIMUM DENSITY. IN NO CASE SHALL THE MATERIAL BE WORKED AT MORE THAN 2% ABOVE OR BELOW OPTIMUM MOISTURE.



PROPOSED TYPICAL CONCRETE TRAIL SECTION N.T.S.

PAVEMENT SECTION

- ① 5" REINFORCED CONCRETE PAVEMENT W/#3 BARS TYPE I CONCRETE 4,500 PSISTRENGTH AT 28 DAYS PER SPEC. 360S
- ② EMBANKMENT
- ③ 6" FLEXIBLE BASE PER SPEC. 210S
- ④ 6" SUBGRADE PREPARATION

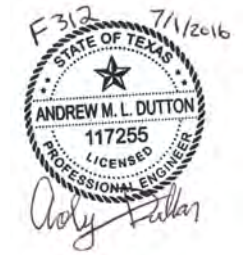
NOTES:

1. CONTRACTOR SHALL ENSURE NO PONDING OCCURS ON THE PATH.
2. ALL CONCRETE TO BE 5" THICK WITH #3 BARS @ 18" O.C.E.W. REINFORCEMENT. ALL REINFORCING BARS SHALL BE CENTERED VERTICALLY USING CHAIRS.
3. FLEXIBLE BASE WILL EXTEND 1 FOOT BEYOND THE EDGE OF PAVEMENT.
4. CONTRACTOR WILL ENSURE THAT ALL CROSS SLOPES ARE 2% MAX.

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
BRUSHY CREEK MUD
16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



HALFF
TEXAS REGISTERED
ENGINEERING FIRM F-312
TWO SIERRA WAY, SUITE 105
GEORGETOWN, TEXAS 78626-7574
TEL (512) 942-6232
FAX (512) 868-0089

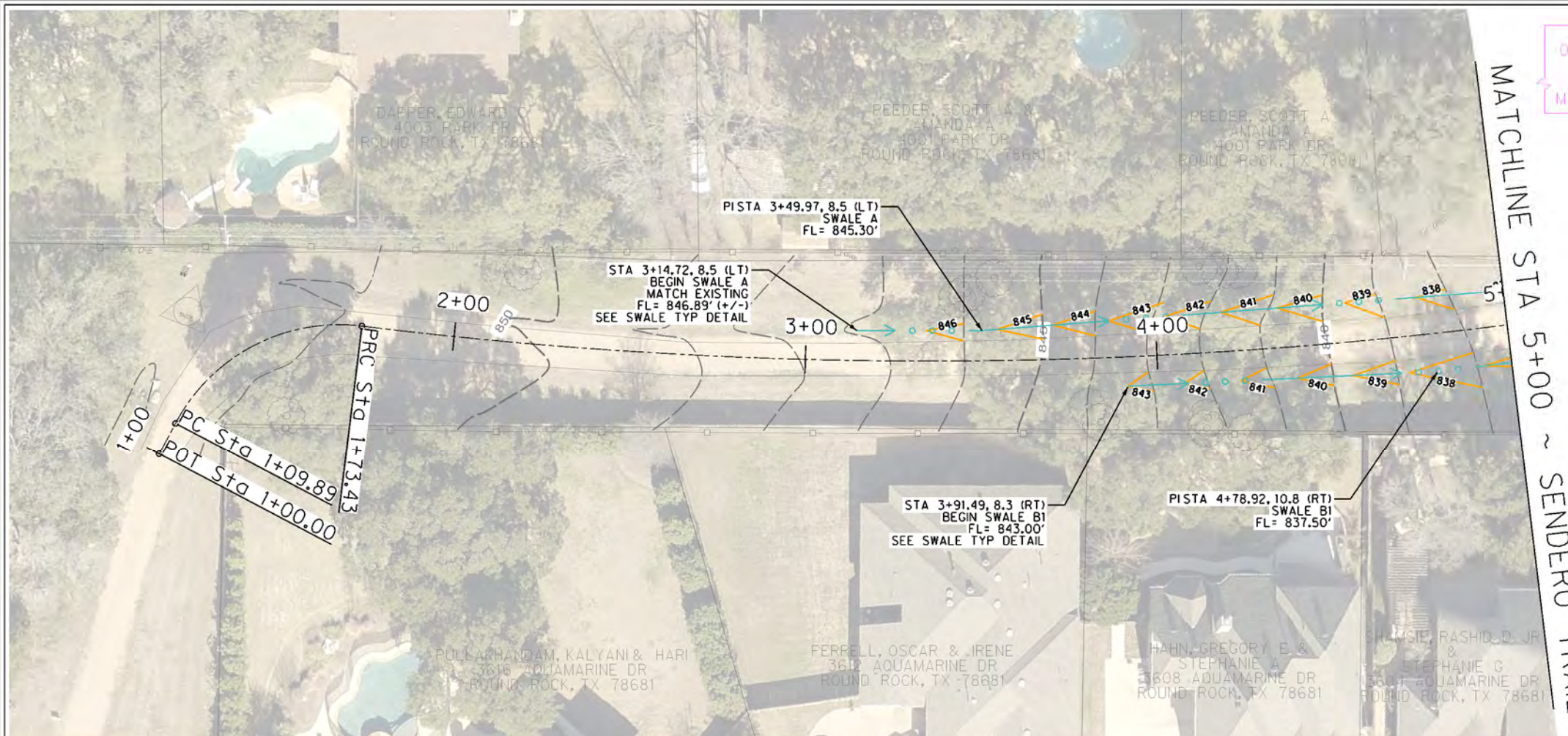


Project No: AV0 #31377

Issue#:

Revisions:		
No.	Date	Description

Drawn by: JN
Checked by: AD
Sheet Title: **TYPICAL SECTIONS**
Sheet Number: **33**



CAUTION !!! OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE

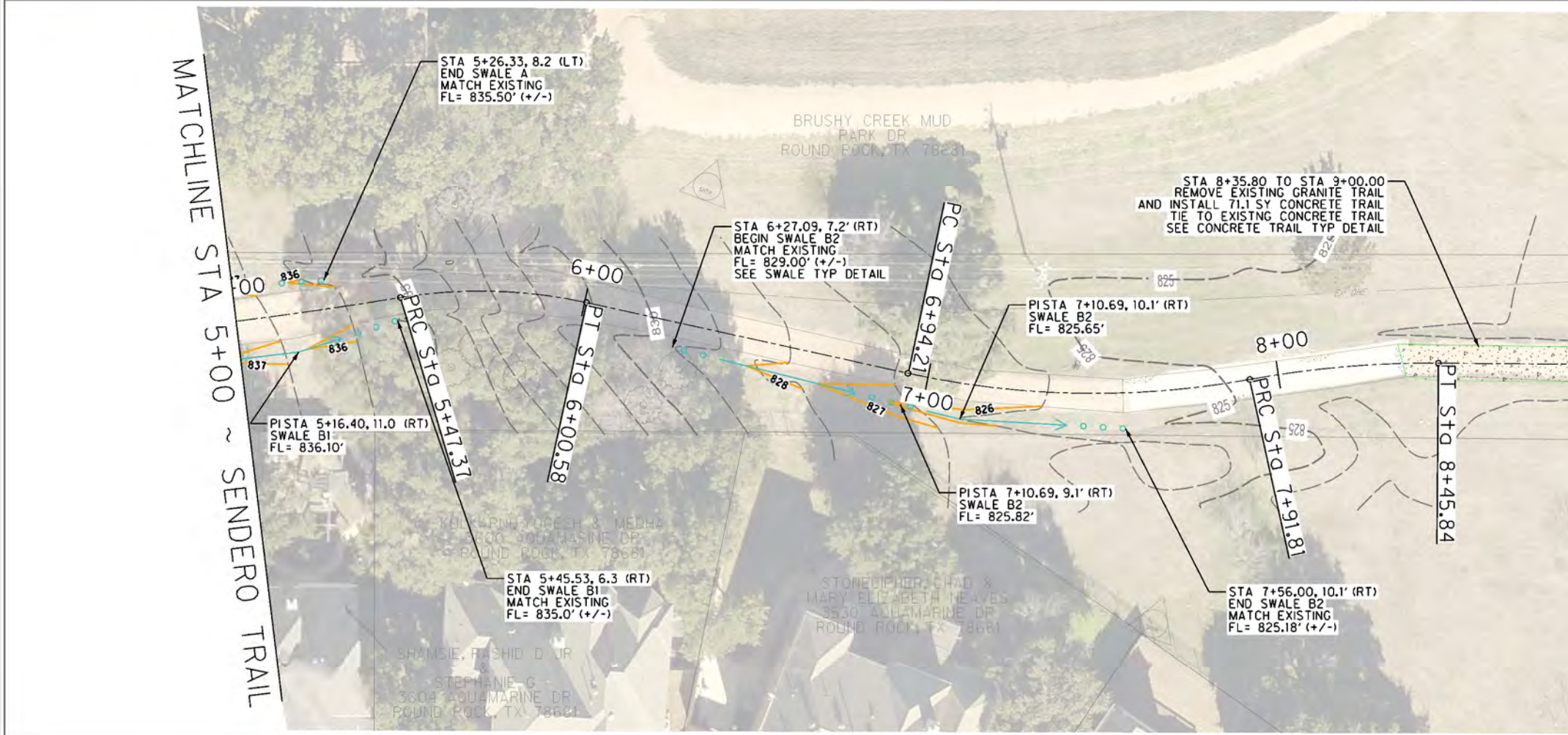
0 10 20 30 40

GENERAL NOTES:
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 4) TRAIL CENTERLINE IS APPROXIMATE. TRAIL REPLACEMENT SHALL MATCH THE EXISTING TRAIL FOOTPRINT IN THE FIELD UNLESS SPECIFICALLY CALLED OUT IN THE PLANS.

LEGEND

- EDGE OF EXISTING ASPHALT
- EDGE OF EXISTING CONCRETE
- EDGE OF EXISTING GRAVEL
- EXISTING FENCE
- EXISTING PROPERTY LINE
- EXISTING CONTOUR
- PROJECT BASELINE
- EXISTING TREE
- ▭ PROPOSED CONCRETE PAVEMENT/FLUME
- ▨ TRAIL REMOVAL
- ▭ PROPOSED GRANITE TRAIL
- 820 — PROPOSED CONTOUR
- PROPOSED GRADE BREAK
- PROPOSED SWALE FLOW LINE
- ▨ ROCK RIP RAP
- △ SURVEY CONTROL POINT

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR,
 ROUND ROCK, TX 78681



CAUTION !!! OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE

0 10 20 30 40

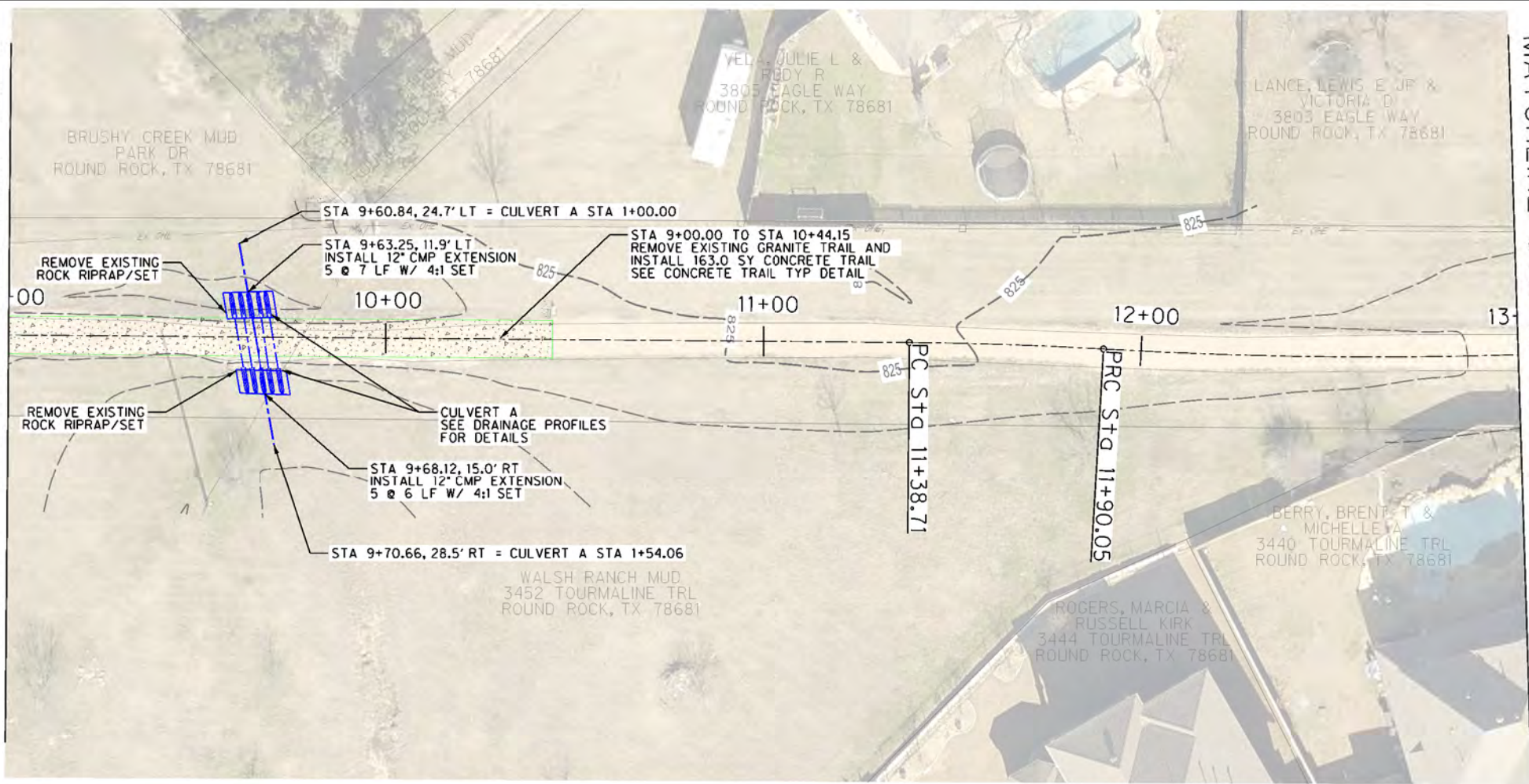
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Project No: AVD *31377
 Issued:
 Revisions:
 No. | Date | Description

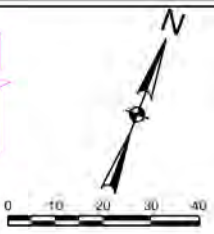
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 Checked by: JH
 Sheet Title: **DRAINAGE & TRAIL**
 FROM STA 1+00 TO STA 9+00

34
 Sheet Number

MATCHLINE STA 9+00 ~ SENDERO TRAIL



CAUTION III OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE



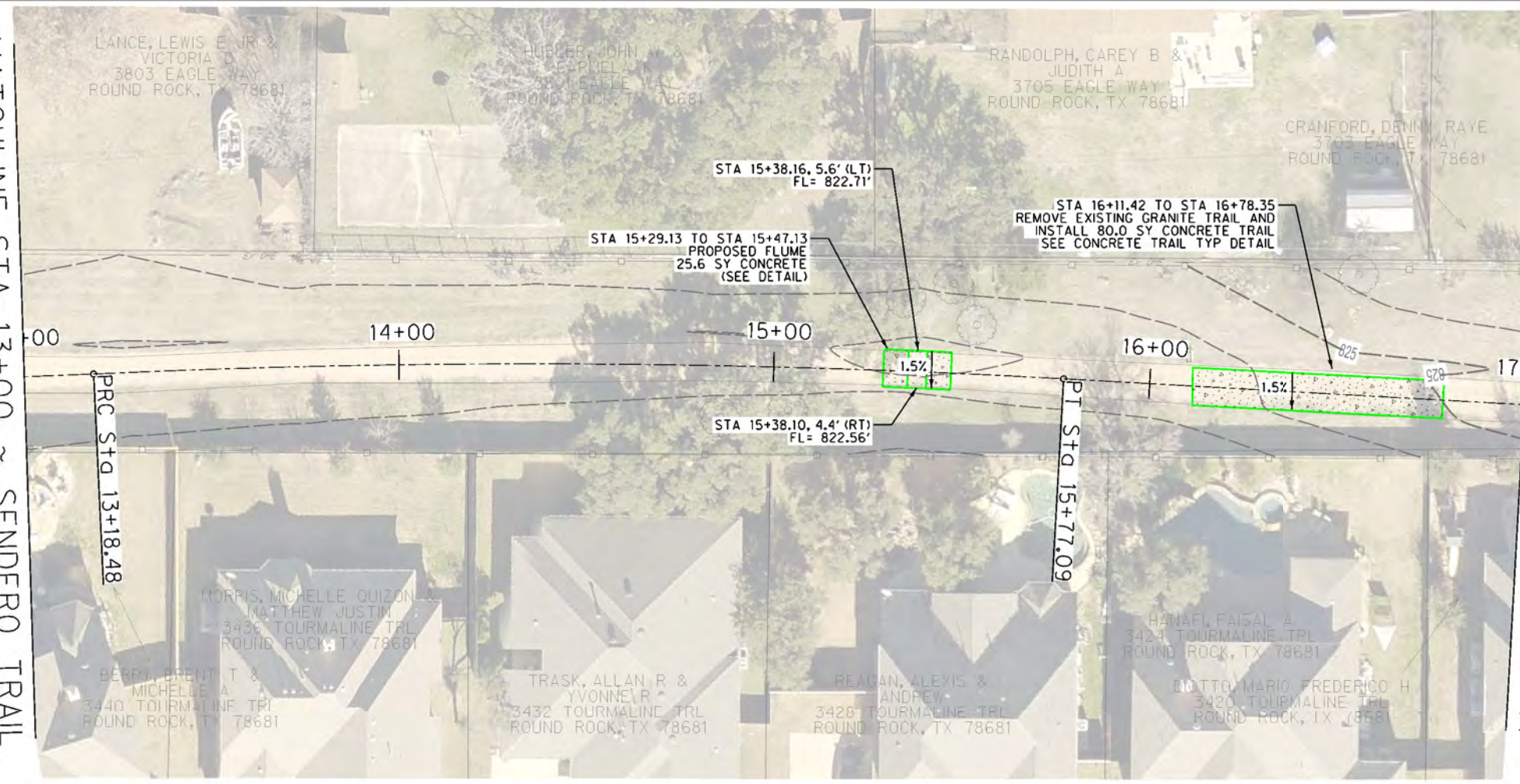
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LEGEND

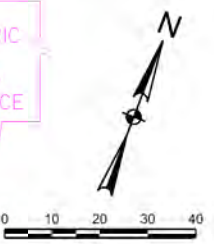
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	EDGE OF EXISTING GRAVEL
	EXISTING FENCE
	EXISTING PROPERTY LINE
	EXISTING CONTOUR
	PROJECT BASELINE
	EXISTING TREE
	PROPOSED CONCRETE PAVEMENT/FLUME
	TRAIL REMOVAL
	PROPOSED GRANITE TRAIL
	PROPOSED CONTOUR 825
	PROPOSED GRADE BREAK
	PROPOSED SWALE FLOW LINE
	ROCK RIP RAP
	SURVEY CONTROL POINT

MATCHLINE STA 13+00 ~ SENDERO TRAIL

MATCHLINE STA 13+00 ~ SENDERO TRAIL



CAUTION III OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE

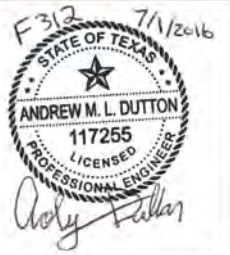


MATCHLINE STA 17+00 ~ SENDERO TRAIL

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
BRUSHY CREEK MUD
16318 GREAT OAKS DR,
ROUND ROCK, TX 78681



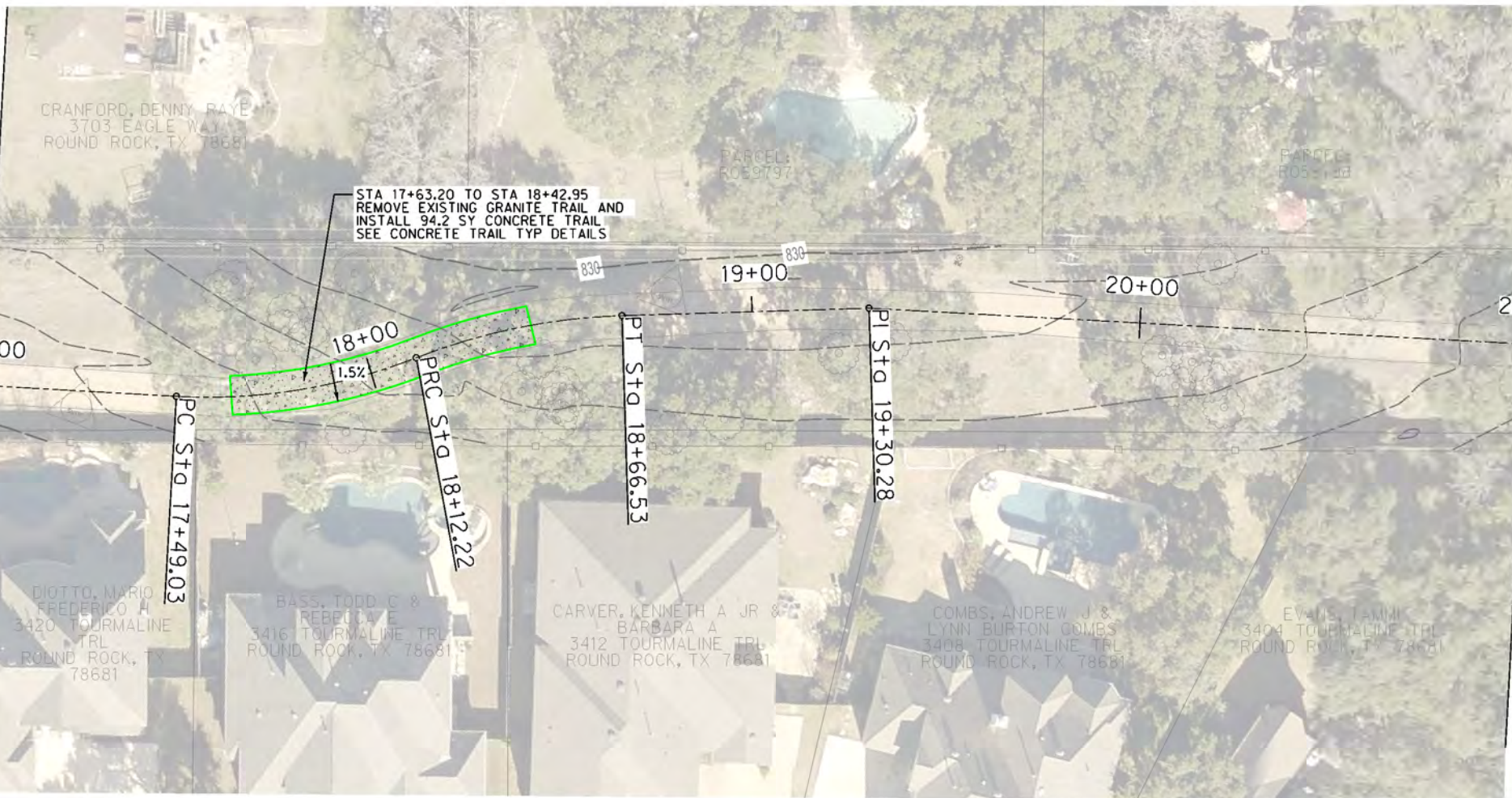
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Project No: AVD #31377
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Revisions:
No. Date Description

Drawn by: JH
Checked by: AD
Sheet Title: **DRAINAGE & TRAIL**
FROM STA 9+00 TO STA 17+00

MATCHLINE STA 17+00 ~ SENDERO TRAIL



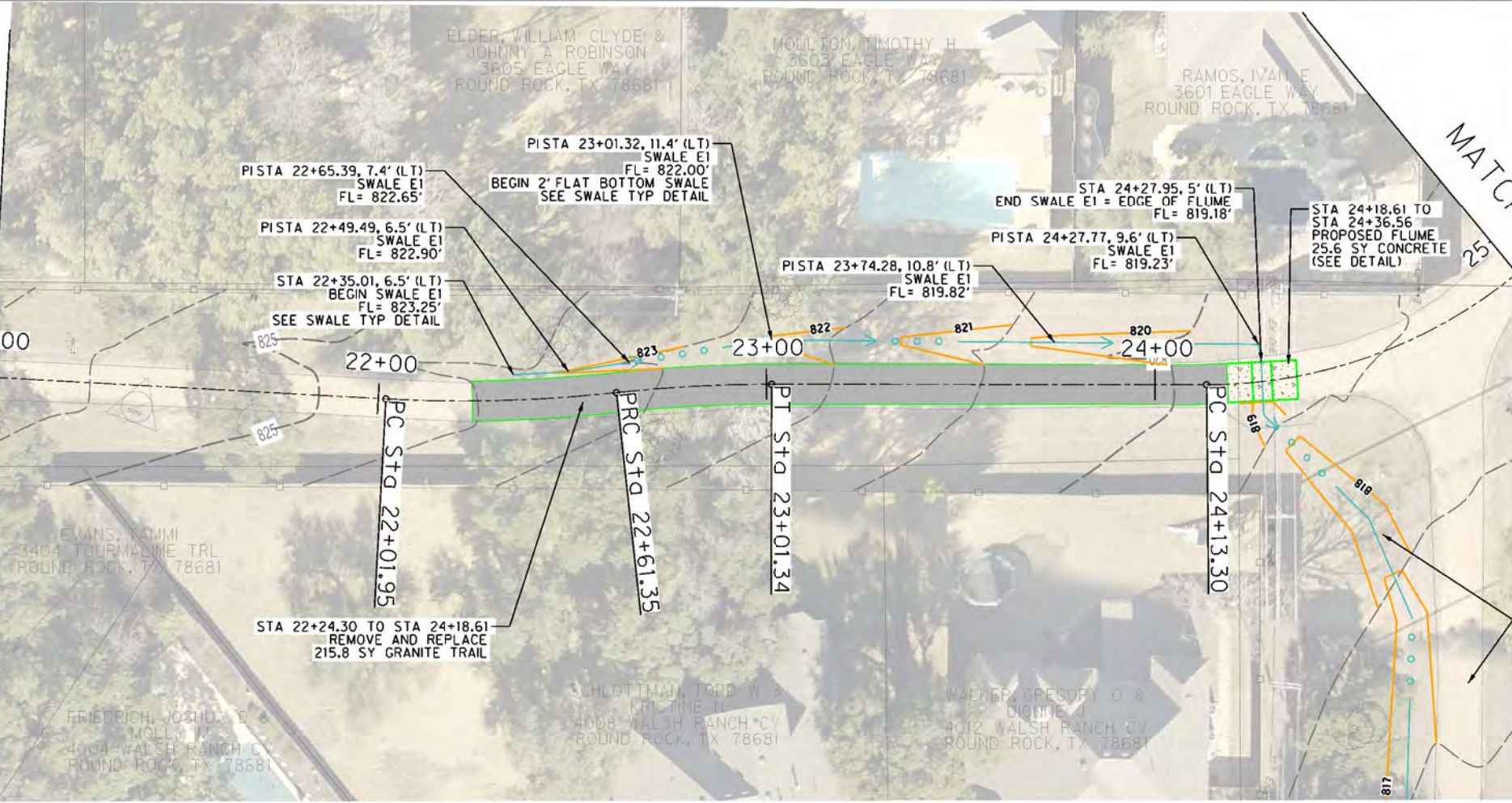
MATCHLINE STA 21+00 ~ SENDERO TRAIL

CAUTION III OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE

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- LEGEND
- EDGE OF EXISTING ASPHALT
 - EDGE OF EXISTING CONCRETE
 - EDGE OF EXISTING GRAVEL
 - EXISTING FENCE
 - EXISTING PROPERTY LINE
 - EXISTING CONTOUR
 - PROJECT BASELINE
 - EXISTING TREE
 - PROPOSED CONCRETE PAVEMENT/FLUME
 - TRAIL REMOVAL
 - PROPOSED GRANITE TRAIL
 - PROPOSED CONTOUR
 - PROPOSED GRADE BREAK
 - PROPOSED SWALE FLOW LINE
 - ROCK RIP RAP
 - SURVEY CONTROL POINT

MATCHLINE STA 21+00 ~ SENDERO TRAIL



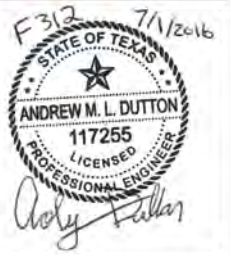
MATCHLINE STA 25+00 ~ SENDERO TRAIL

CAUTION III OVERHEAD ELECTRIC LINES IN AREA. CONTRACTOR TO MAINTAIN CLEARANCE

SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR,
 ROUND ROCK, TX 78681



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Project No: AUC #31377	Issued:
Revisions:	
No. Date Description	
Drawn by: JH	Checked by: AD
Sheet Title: DRAINAGE & TRAIL	FROM STA 17+00 TO STA 25+00
Sheet Number: 36	



- GENERAL NOTES:
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LEGEND

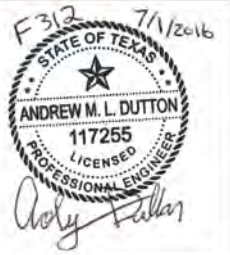
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[Symbol]	PROPOSED CONCRETE PAVEMENT/FLUME
[Symbol]	TRAIL REMOVAL
[Symbol]	PROPOSED GRANITE TRAIL
[Symbol]	PROPOSED CONTOUR
[Symbol]	PROPOSED GRADE BREAK
[Symbol]	PROPOSED SWALE FLOW LINE
[Symbol]	ROCK RIP RAP
[Symbol]	SURVEY CONTROL POINT



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR,
 ROUND ROCK, TX 78681

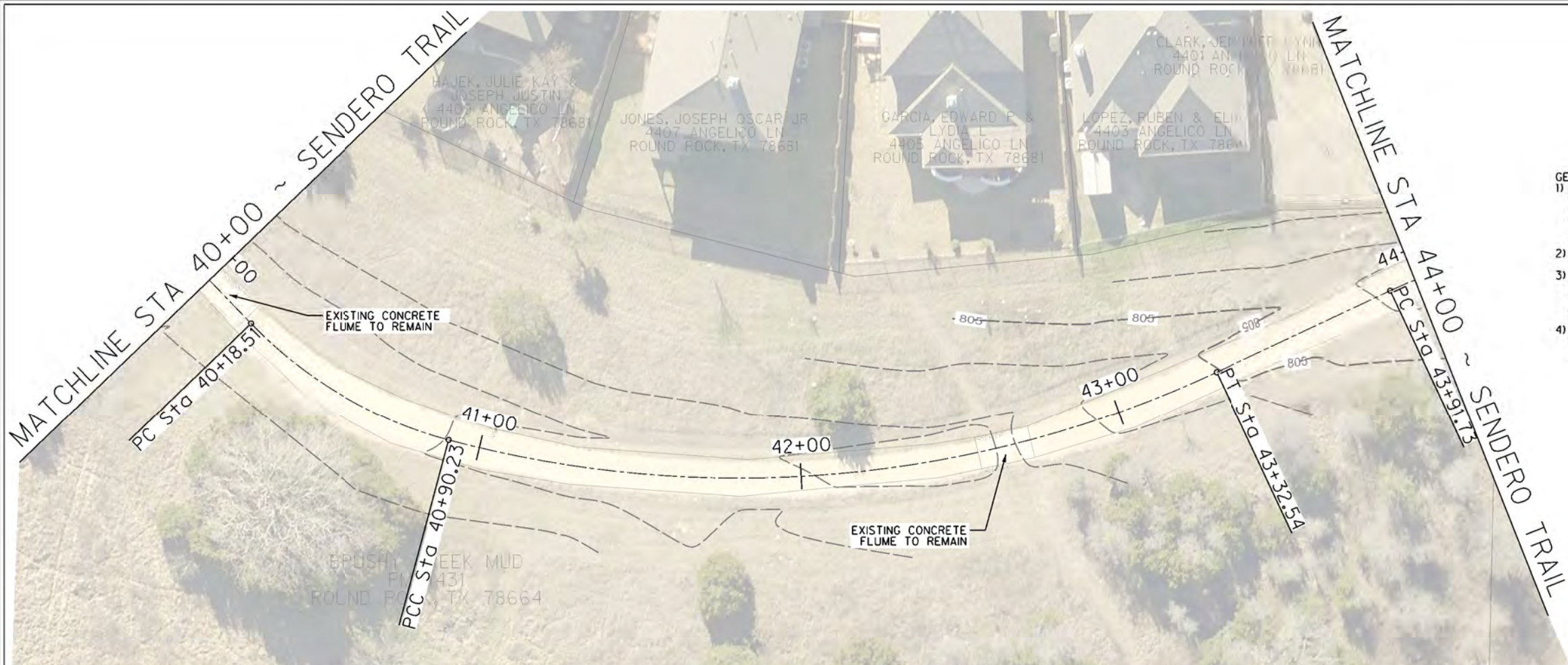


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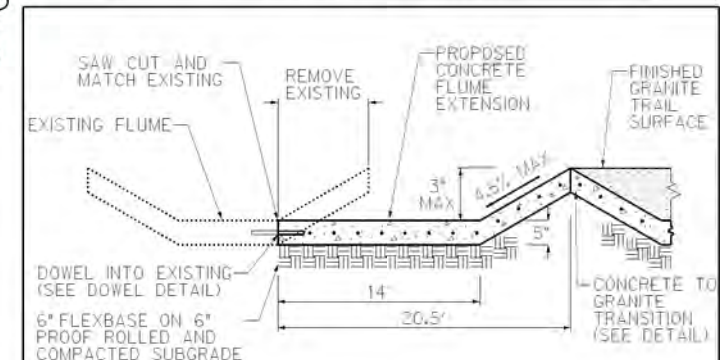
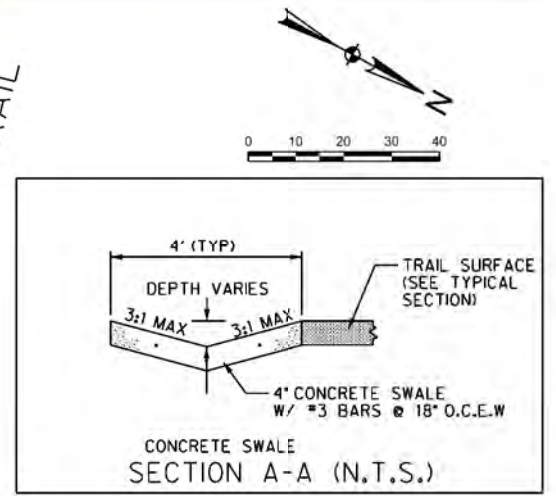
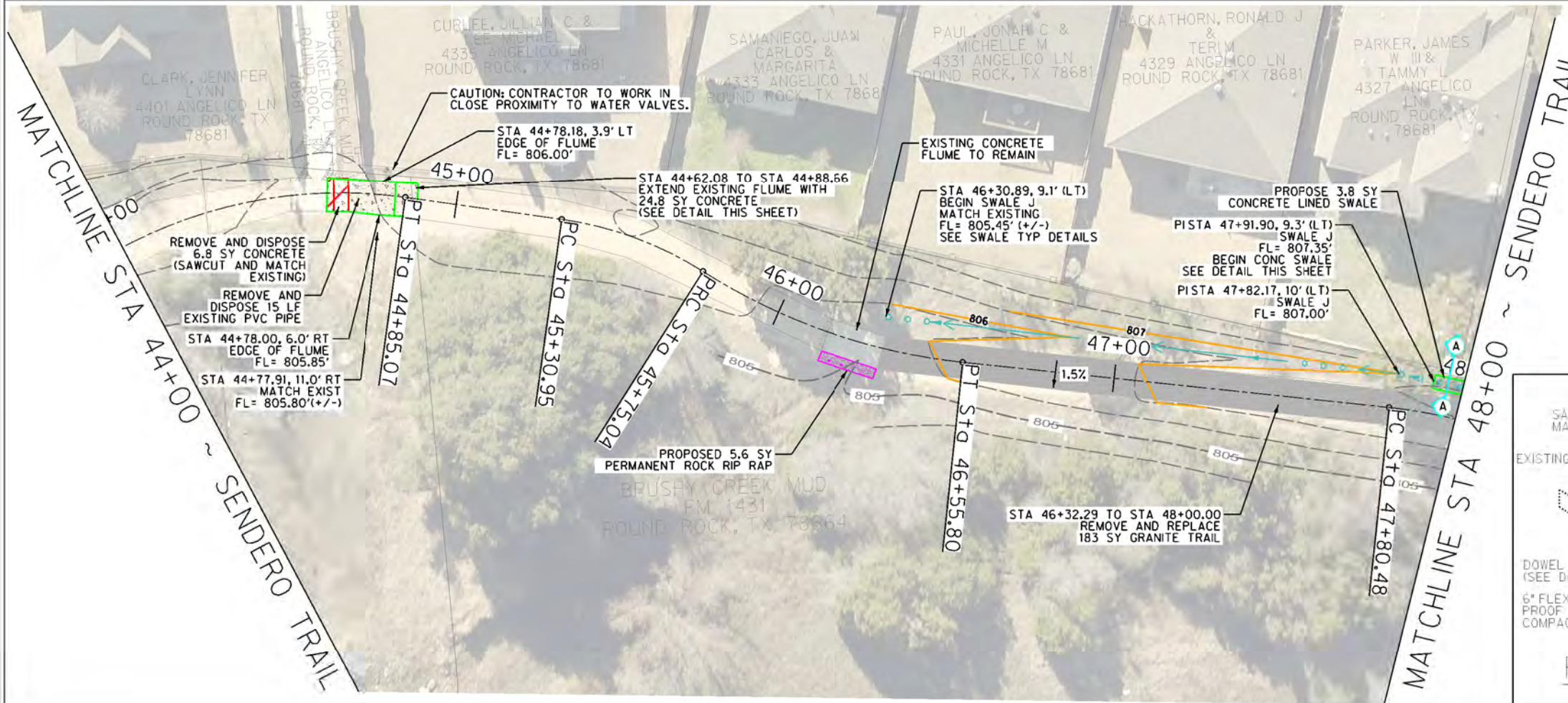
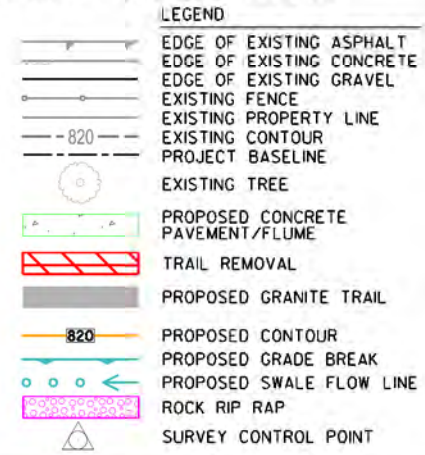


Project No:	AVD #31377	
Issued:		
Revisions:		
No.	Date	Description

Drawn by: JH
 Checked by: JH
 Sheet Title: **DRAINAGE & TRAIL**
 FROM STA 37+00 TO STA 40+00



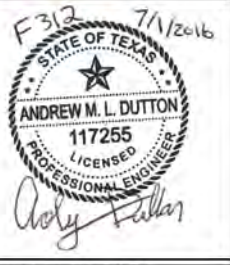
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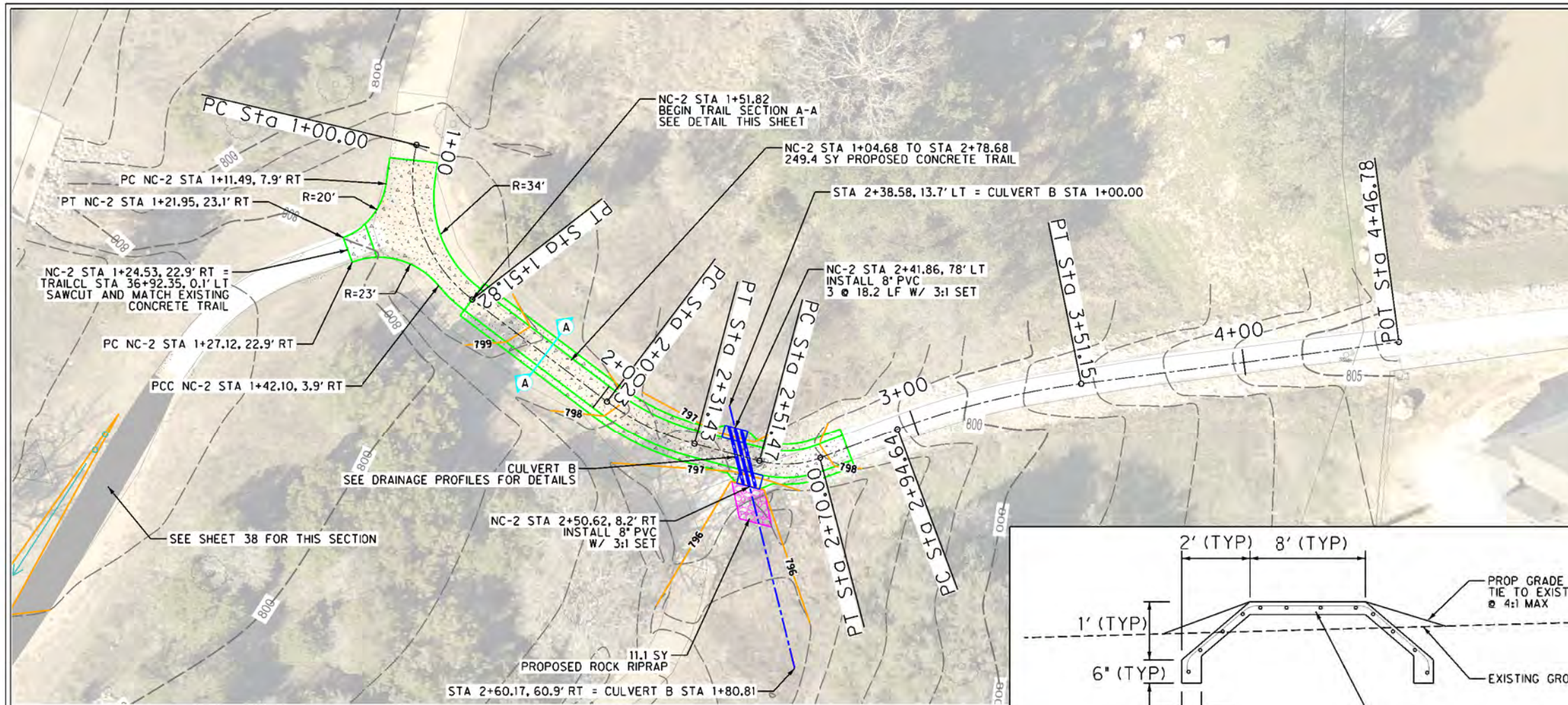
SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR.,
 ROUND ROCK, TX 78681



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 GEORGETOWN, TEXAS 78626-7574
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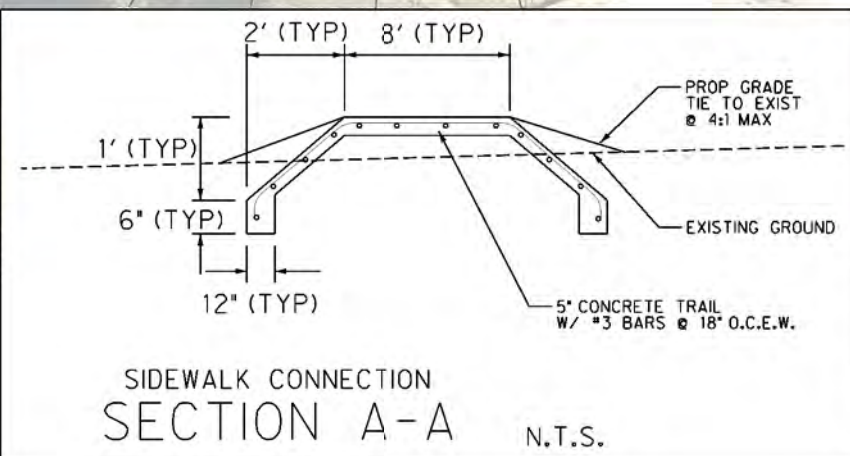
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Revisions:	
Rev. No.	Date
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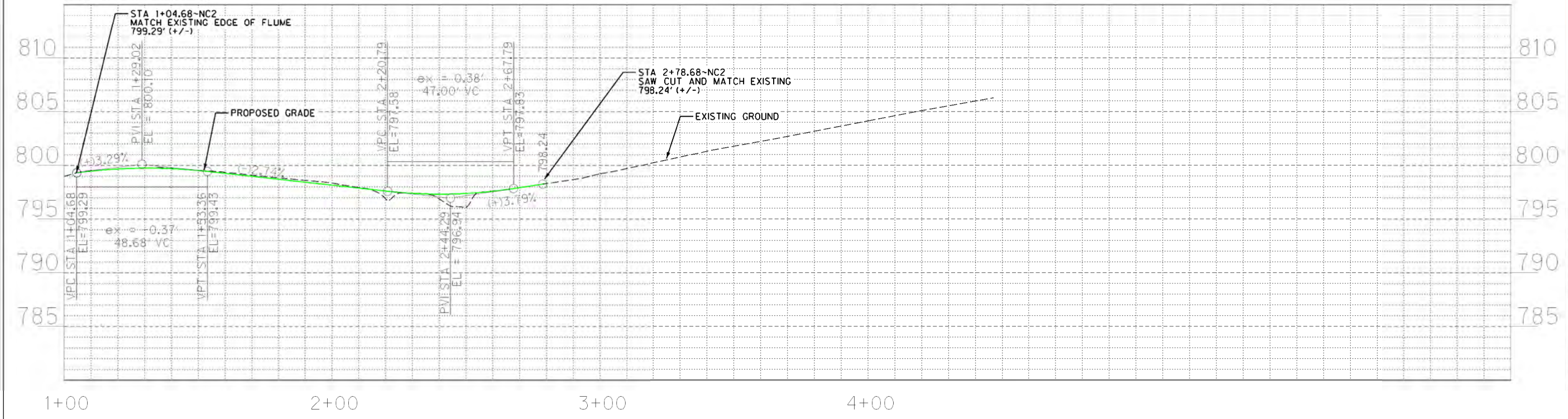
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LEGEND

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- EDGE OF EXISTING CONCRETE
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- EXISTING CONTOUR
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- PROPOSED CONTOUR
- PROPOSED GRADE BREAK
- PROPOSED SWALE FLOW LINE
- ROCK RIP RAP
- SURVEY CONTROL POINT



H: 1" = 40'
 V: 1" = 10'
 ON 11"X17" SHEET



SENDERO SPRINGS
 TRAIL & DRAINAGE
 IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR,
 ROUND ROCK, TX 78681



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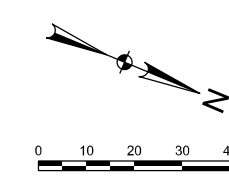
F312 7/1/2016
 STATE OF TEXAS
 ANDREW M. L. DUTTON
 117255
 LICENSED PROFESSIONAL ENGINEER
 Andy Dutton

Project No: AVD *31377

Issued:

Revisions	No.	Date	Description

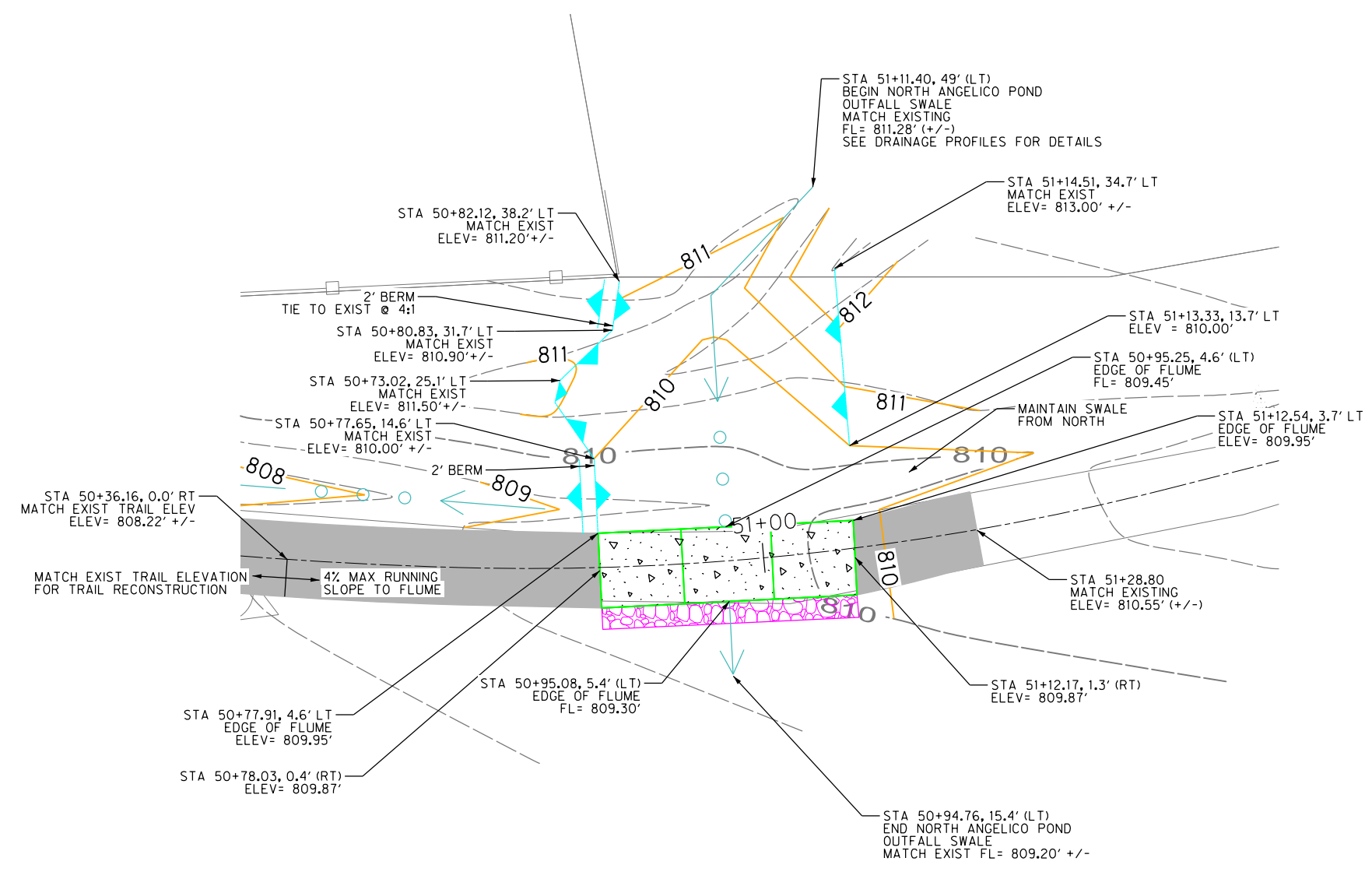
Drawn by: JH
 Checked by: JH
 Sheet Title: DRAINAGE & TRAIL NEIGHBORHOOD CONNECTION 2
 Sheet Number: 45



- GENERAL NOTES:
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LEGEND

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	EDGE OF EXISTING CONCRETE
	EDGE OF EXISTING GRAVEL
	EXISTING FENCE
	EXISTING PROPERTY LINE
	EXISTING CONTOUR
	PROJECT BASELINE
	EXISTING TREE
	PROPOSED CONCRETE PAVEMENT/FLUME
	TRAIL REMOVAL
	PROPOSED GRANITE TRAIL
	PROPOSED CONTOUR
	PROPOSED GRADE BREAK
	PROPOSED SWALE FLOW LINE
	ROCK RIP RAP
	SURVEY CONTROL POINT



GRADING @ NORTH ANGELICO POND OUTFALL

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
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16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



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GEORGETOWN, TEXAS 78626-7574
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F312 7/1/2016
STATE OF TEXAS
ANDREW M. L. DUTTON
117255
LICENSED PROFESSIONAL ENGINEER
Andrew Dutton

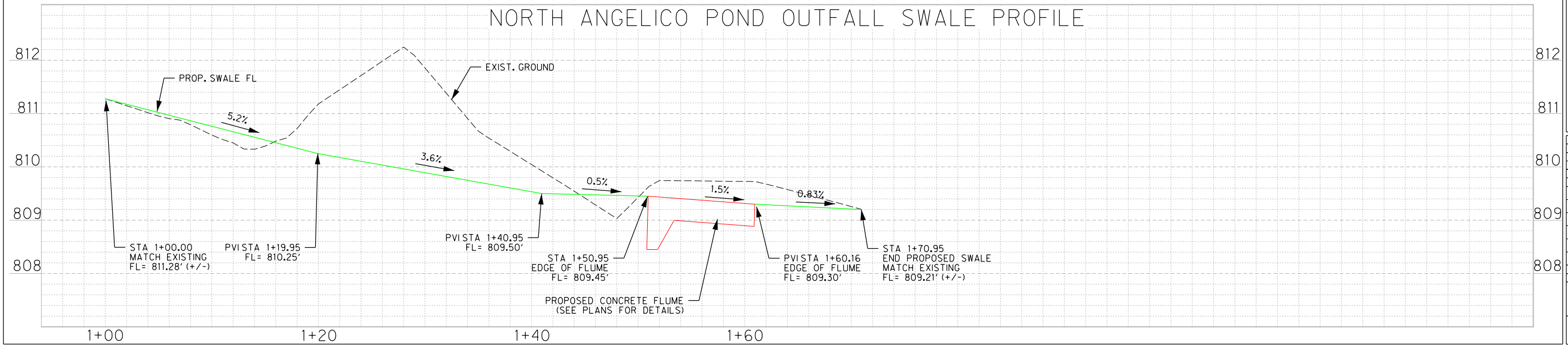
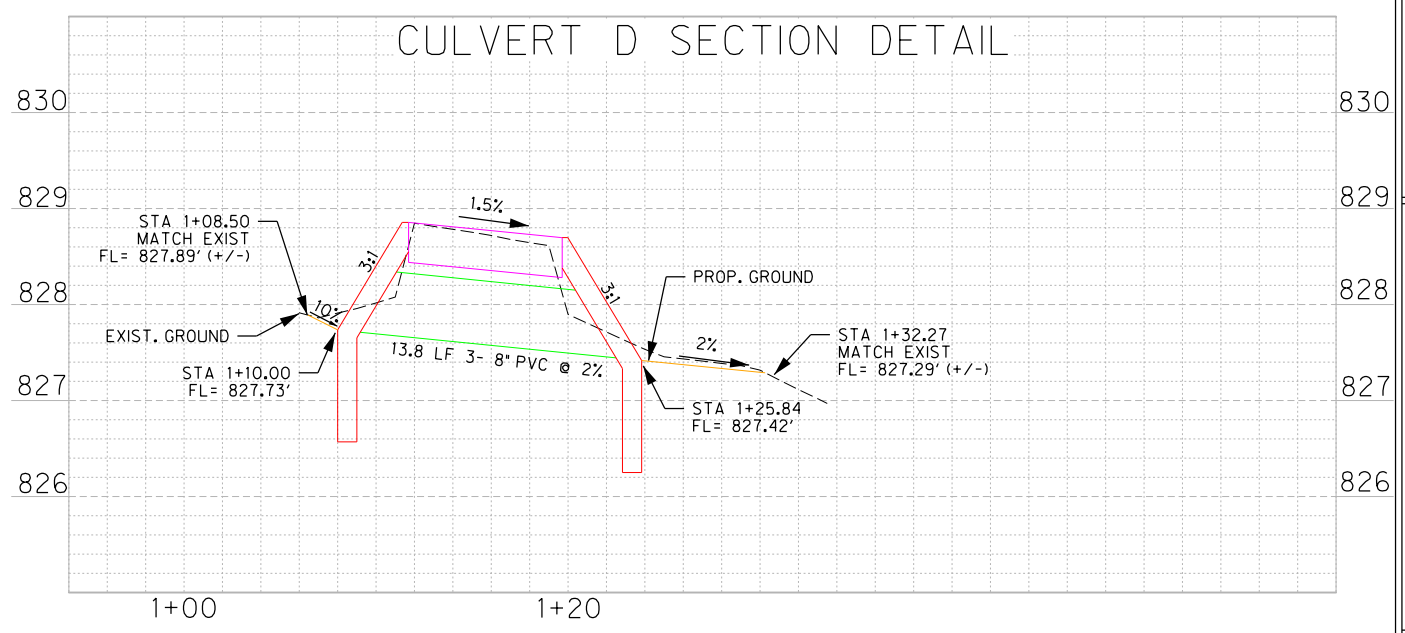
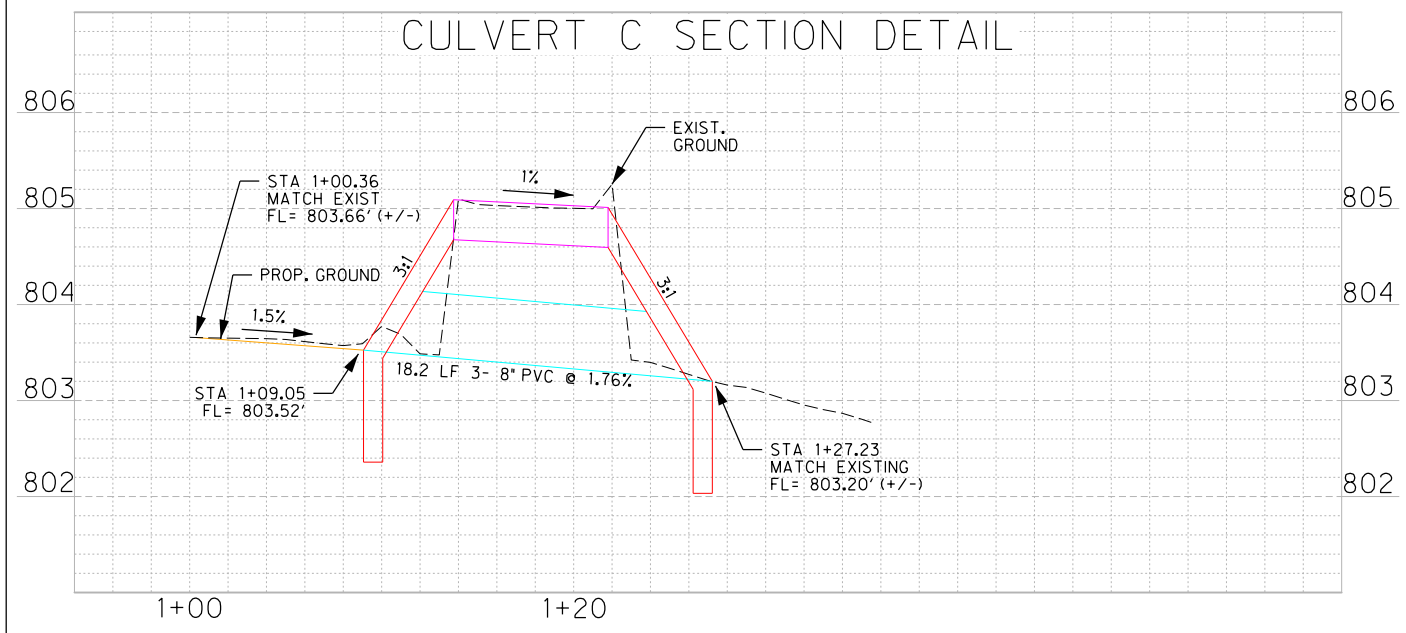
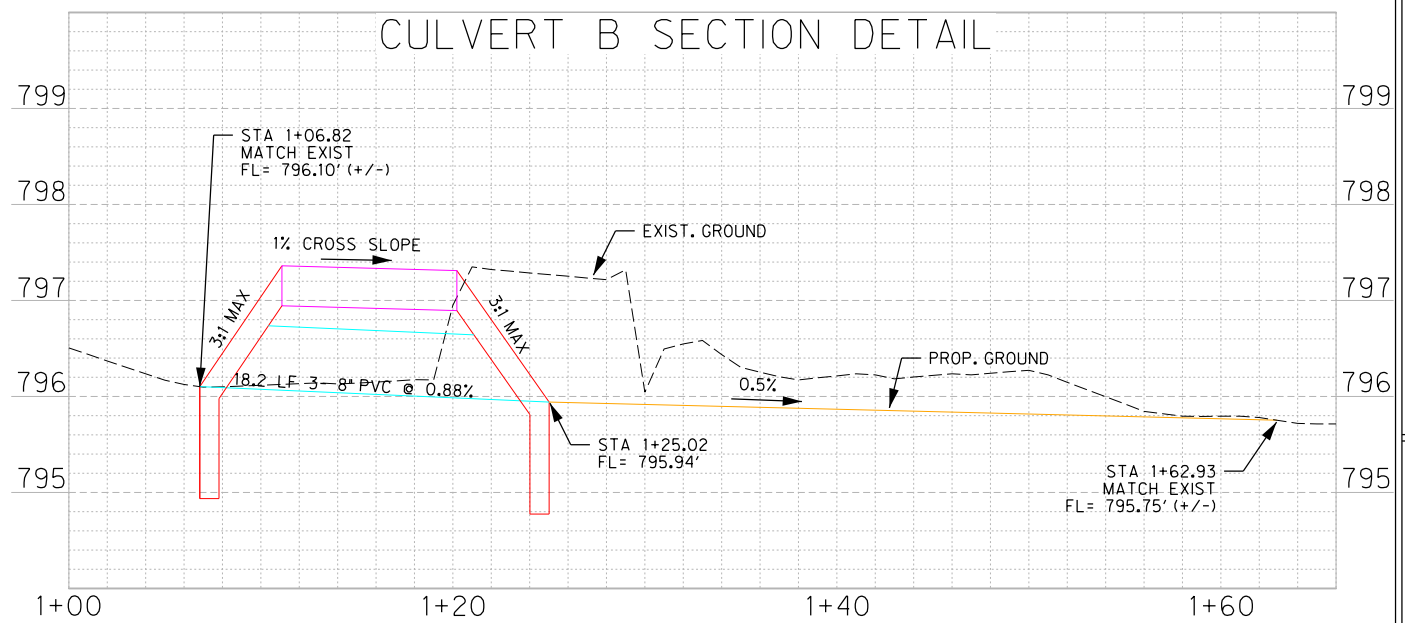
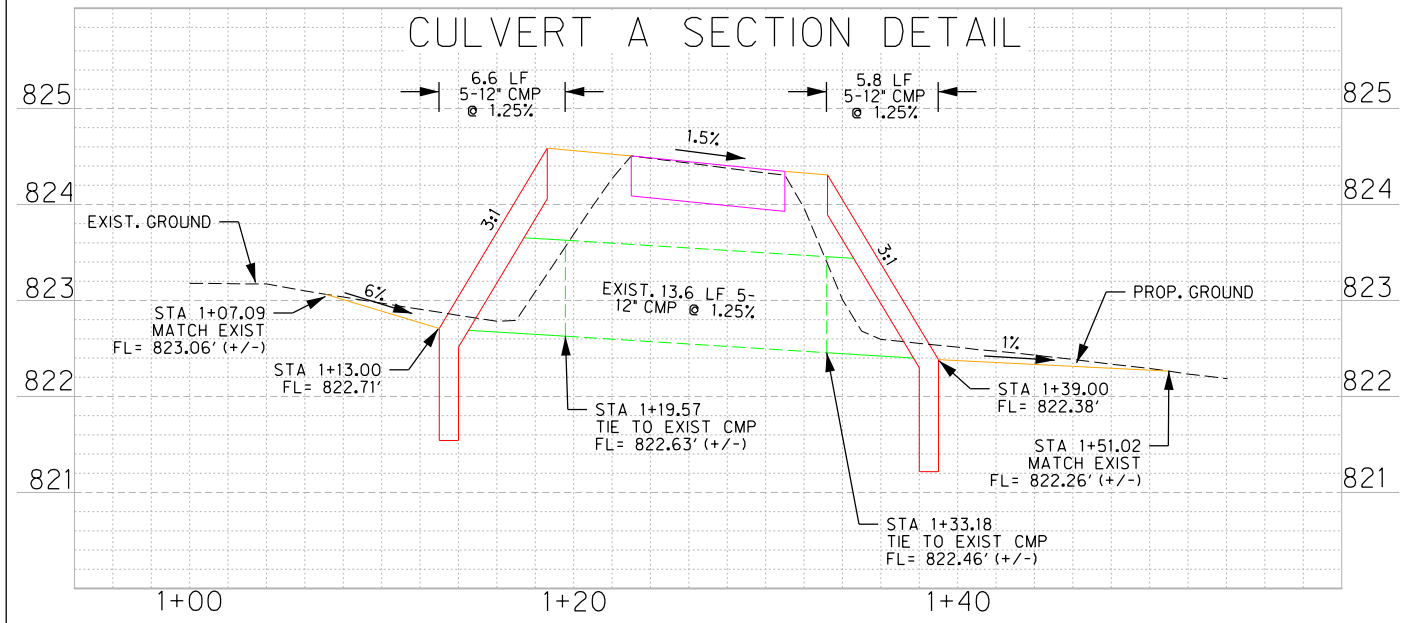
Project No: AV0 #31377

Issued:

Revisions:		
No.	Date	Description

Drawn by: JN
Checked by: AD
Sheet Title
GRADING DETAILS
Sheet Number
47

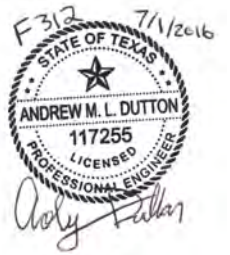
SCALE
 H: 1" = 10'
 V: 1" = 2"
 ON 11"x17" SHEET



SENDERO SPRINGS TRAIL & DRAINAGE IMPROVEMENTS
 BRUSHY CREEK MUD
 16318 GREAT OAKS DR.
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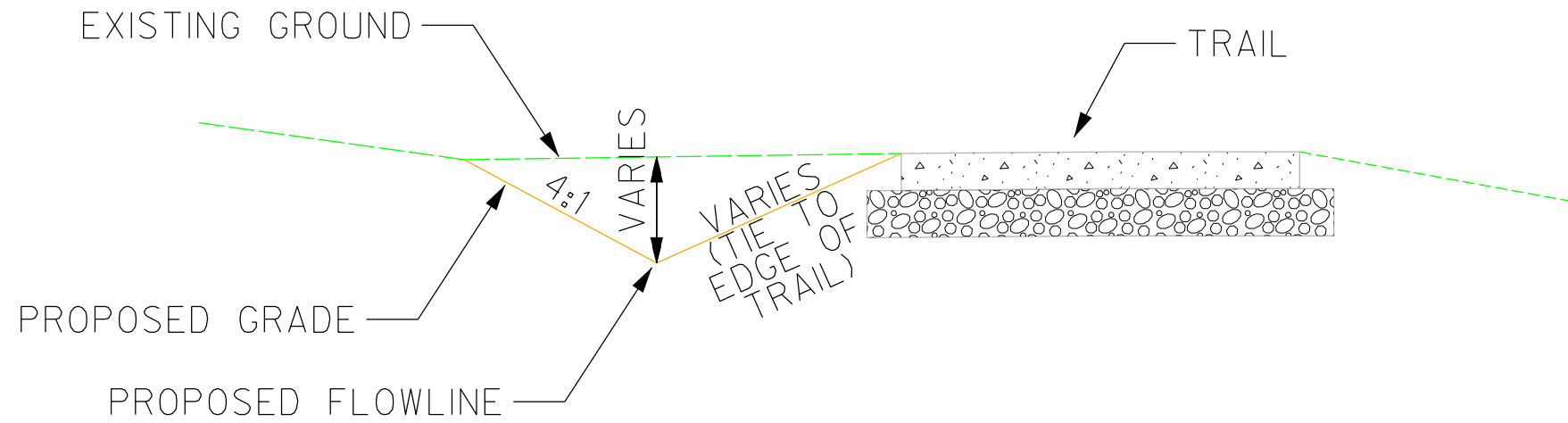


Project No: AV0 31377

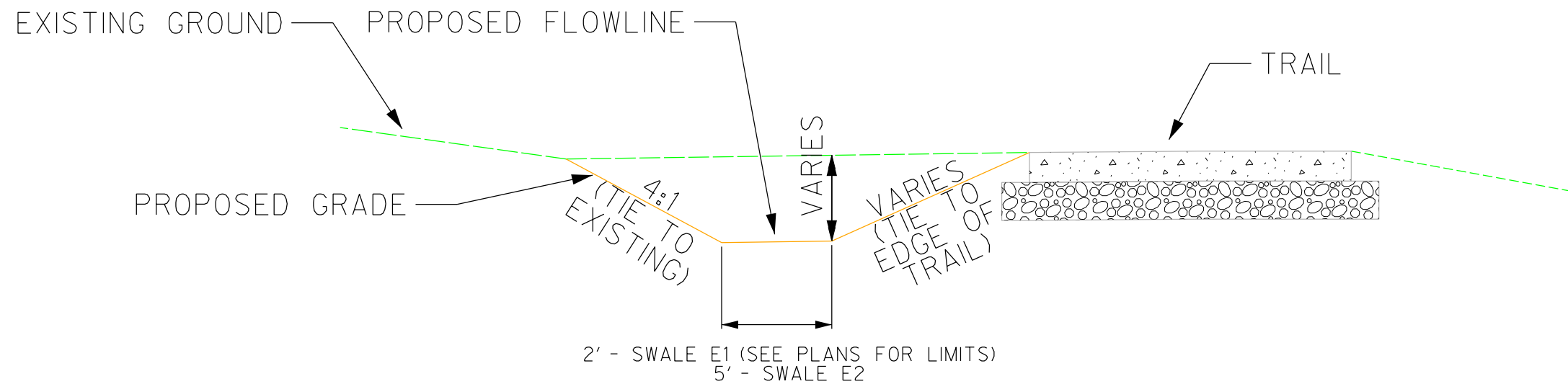
Issue:

Revisions:	No.	Date	Description

Drawn by: JN
 Checked by: AD
 Sheet Title: **DRAINAGE PROFILES**
 Sheet Number: **48**



PROPOSED TYPICAL DRAINAGE GRADE "V" CROSS SECTION N.T.S.
 SWALE - A, B1, B2, E1, F, G, H, I, J, K, L

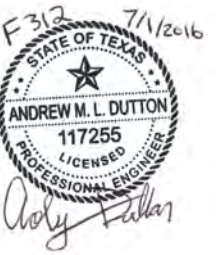


PROPOSED TYPICAL DRAINAGE GRADE FLAT BOTTOM CROSS SECTION N.T.S.
 SWALE - E1, E2

SENDERO SPRINGS
 TRAIL & DRAINAGE
 IMPROVEMENTS
 BRUSHY CREEK MUD
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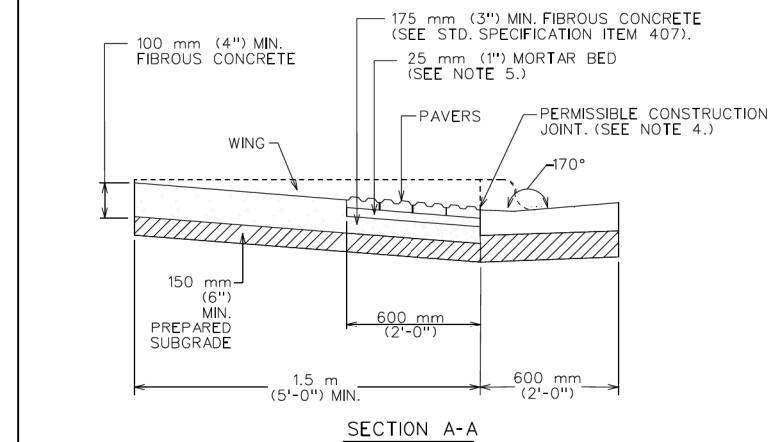
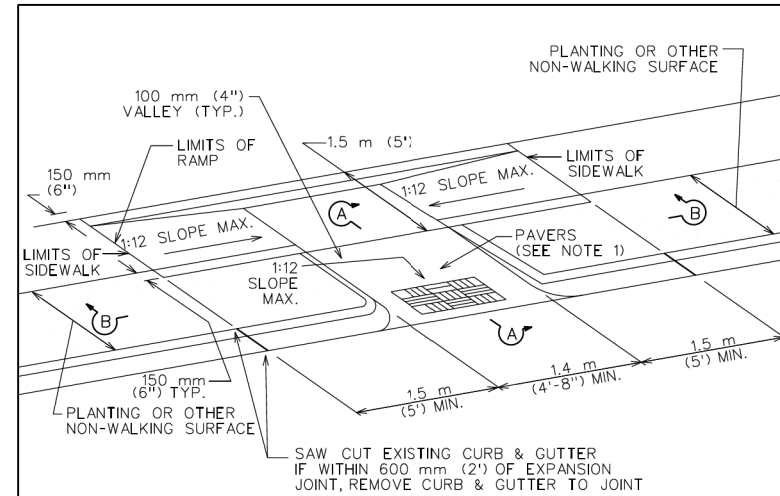


Project No: AV0 #31377
 Issued: _____

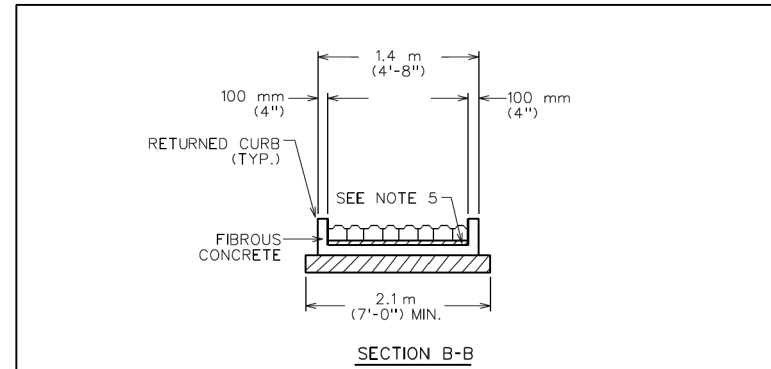
Revisions:		
No.	Date	Description

Drawn by: JN
 Checked by: AD
 Sheet Title:
DRAINAGE
 DETAILS

Sheet Number
50



CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		COMBINED SIDEWALK CURB RAMP WITH PAVERS	
RECORD COPY SIGNED BY BILL GARDNER	03/13/06 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3F 1 OF 2



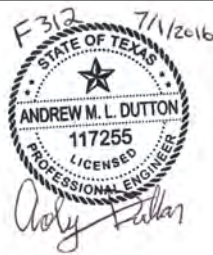
- GENERAL NOTES:
- THIS STANDARD IS APPLICABLE FOR RAMP CONSTRUCTION WITHIN RIGHT-OF-WAY OR EASEMENT ONLY.
 - PAVERS WILL HAVE DETECTABLE WARNING THAT CONSISTS OF RAISED TRUNCATED DOMES WITH A DIAMETER OF 23 mm (0.9"), A NOMINAL HEIGHT OF 5 mm (0.2") AND A NOMINAL CENTER TO CENTER SPACING OF 60 mm (2.35") AND SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT (Re: ADAAG SECTION 4.29.2). MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. A BASKET WEAVE PAVER PATTERN SHALL BE USED UNLESS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. PAVER PATTERN VARIES PER MANUFACTURER'S RECOMMENDATIONS. REFER TO STANDARD DETAIL 432S-5 FOR PAVER BASE PREPARATION DETAILS.
 - THE CURB, GUTTER AND RAMP SYSTEM SHALL BE CONFIGURED TO MAINTAIN ALL RUNOFF FROM A 25 YEAR FREQUENCY STORM WITHIN THE RIGHT-OF-WAY (DRAINAGE CRITERIA MANUAL SECTION 1.2.2.B).
 - TYPICAL SIDEWALK WIDTHS AND CURB RADII ARE SHOWN FOR ILLUSTRATION ONLY. REFER TO THE TRANSPORTATION CRITERIA MANUAL FOR SIDEWALK WIDTHS, CURB RADII AND CURB BASIC REQUIREMENTS.
 - THE PERMISSIBLE CONSTRUCTION JOINT BETWEEN THE PAVERS AND THE ADJOINING SURFACE SHALL BE LIMITED TO 6 mm (1/4") JOINT SIZE. GAPS LARGER THAN 6 mm (1/4") MUST BE APPROVED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. ALL JOINTS BETWEEN BRICKS AND ADJOINING SURFACE SHALL BE MORTAR FILLED UNLESS DIRECTED OTHERWISE BY THE ENGINEER OR DESIGNATED REPRESENTATIVE.
 - MORTAR SHALL CONFORM TO STD. SPECIFICATION ITEM SECTION 403S.3.5, MORTAR AND GROUT. ALL OTHER CONCRETE SHALL CONFORM TO STD. SPECIFICATION ITEM 403S, CONCRETE FOR STRUCTURES, UNLESS OTHERWISE NOTED.
 - CURB RAMPS WITH 100 mm (4") CONCRETE VALLEY MAY ONLY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK DIAGONALLY ACROSS THE RAMP.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS		COMBINED SIDEWALK CURB RAMP WITH PAVERS	
RECORD COPY SIGNED BY BILL GARDNER	03/13/06 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 432S-3F 2 OF 2

**SENDERO SPRINGS
TRAIL & DRAINAGE
IMPROVEMENTS**
BRUSHY CREEK MUD
16318 GREAT OAKS DR.
ROUND ROCK, TX 78681



HALFF
TEXAS REGISTERED
ENGINEERING FIRM F-312
TWO SIERRA WAY, SUITE 105
GEORGETOWN, TEXAS 78626-7574
TEL (512) 942-6232
FAX (512) 868-0089



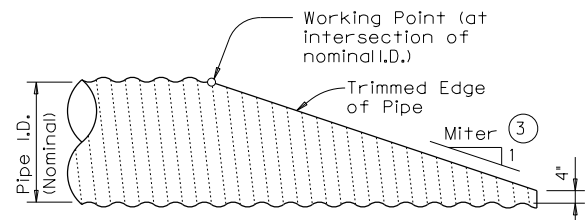
Project No: AV0 #31377
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Drawn by: JN
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Sheet Title:

**DRAINAGE
DETAILS**

Sheet Number
51

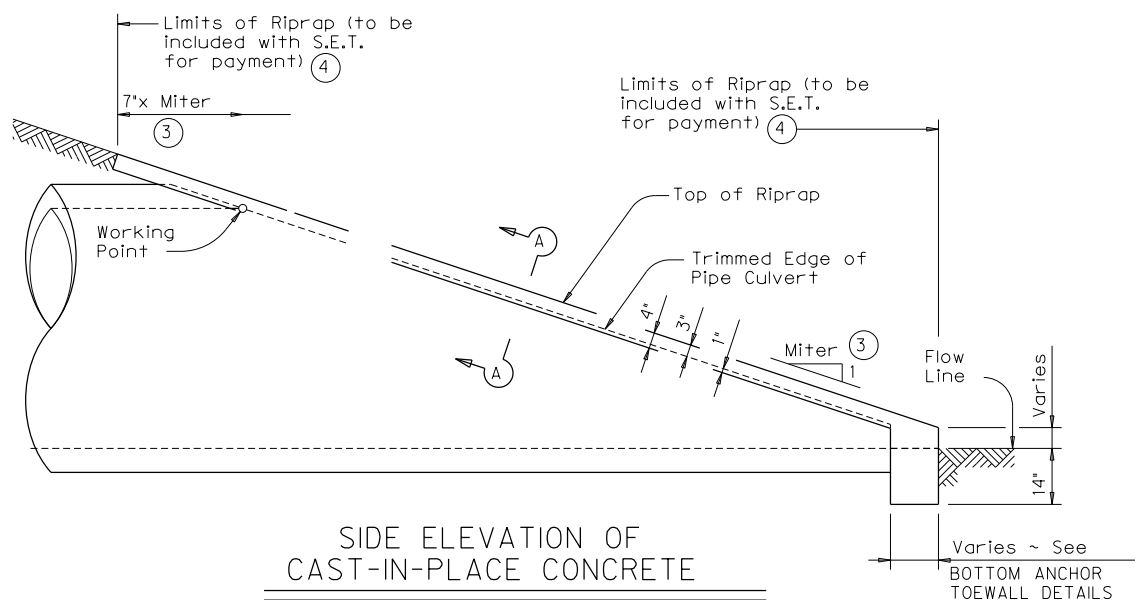


NOTE: All Pipe Runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert. Details of Concrete Pipe Culvert are similar.)

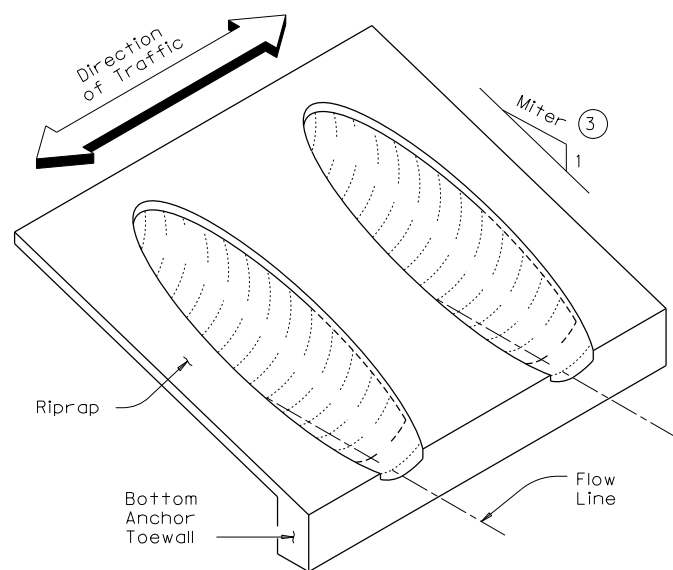
TYPICAL PIPE CULVERT MITERS ⁽³⁾				
Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert. Details of Corrugated Metal Pipe Culvert are similar.)

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) ⁽⁵⁾		
Nominal Culvert I.D.	3:1 Side Slope	4:1 Side Slope
		3 BARREL
8"	0.63	
12"		1.72



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

- ⁽³⁾ Miter = Slope of Mitered Pipe Culvert End
- ⁽⁴⁾ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⁽⁵⁾ Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple Pipe Culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.



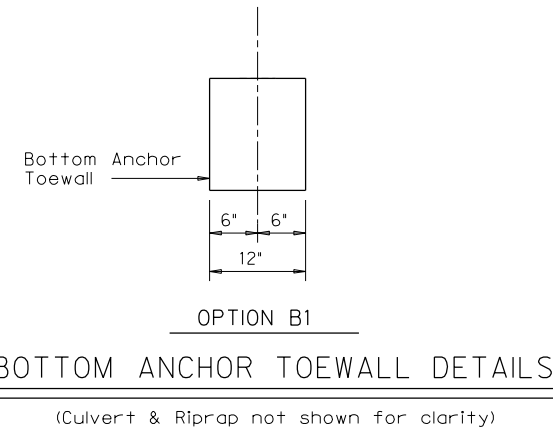
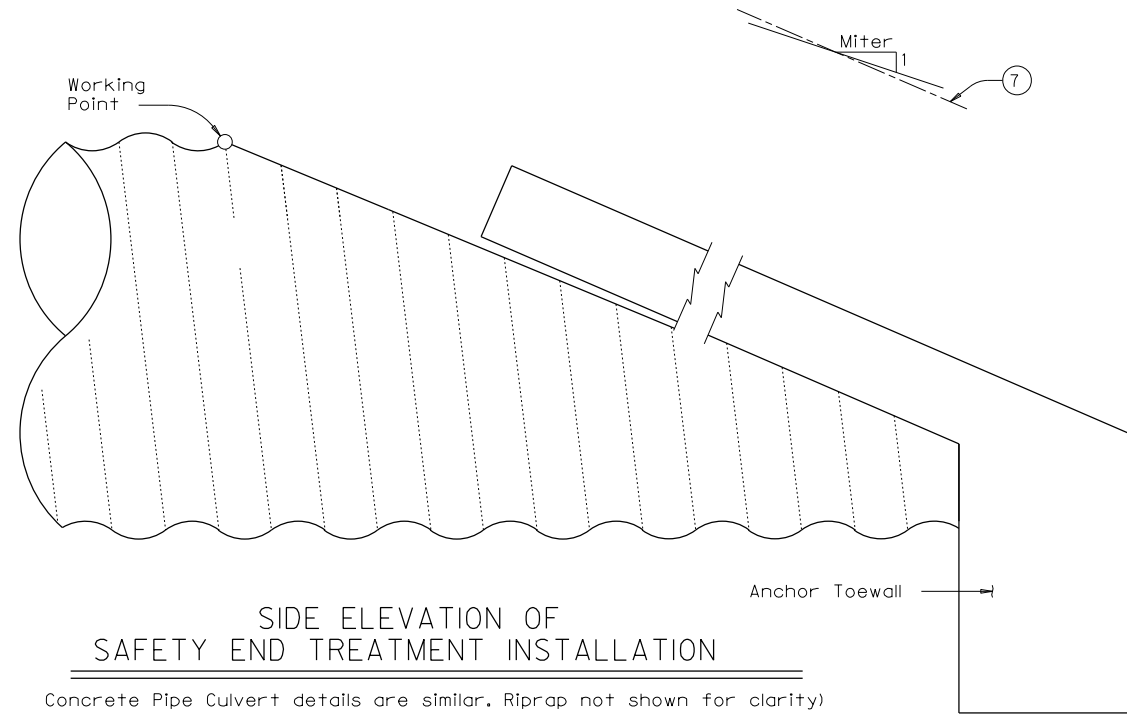
SAFETY END TREATMENT FOR 8" DIA TO 60" DIA PIPE CULVERTS TYPE II ~ CROSS DRAINAGE

DISCLAIMER: The use of this standard is governed by the Texas Engineering Practice Act. No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

LEVELS DISPLAYED	ACC:
1	

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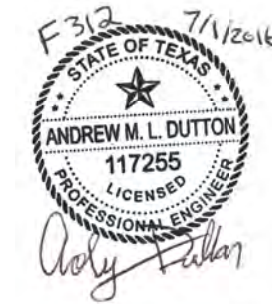
LEVELS DISPLAYED	ACC:
1	



- ④ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⑥ Recommended values of side slope are 3:1, 4:1, & 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

GENERAL NOTES:

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".
 Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.
 Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.
 Pipe Runners, Cross Pipes, and Anchor Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.
 Bolts and nuts shall conform to ASTM A307.
 All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.



SAFETY END TREATMENT
 FOR 8" DIA TO 60" DIA
 PIPE CULVERTS
 TYPE II ~ CROSS DRAINAGE